LNHS

# THE LONDON NATURALIST

Journal of the
LONDON NATURAL HISTORY SOCIETY

No. 87 2008

# LONDON NATURAL HISTORY SOCIETY

The Society welcomes new members, both beginners and experts. Its recording area (the London Area) lies within a 20-mile (32-km) radius of St Paul's Cathedral and here most of its activities take place. Although much covered with bricks and mortar, it is an exciting region with an astonishing variety of flora and fauna. The Society is open to those interested in arachnology, archaeology, botany, conchology, conservation, ecology, entomology, geology, herpetology, mammalogy, ornithology, palaeontology, rambling, and all other aspects of natural history. The Society comprises various sections, but all meetings are open to members without formality.

### Publications

*The London Naturalist,* published annually, contains papers on the natural history and archaeology of the London Area and beyond, including records of plants and animals.

The *London Bird Report,* also published annually, contains the bird records for the London Area for each year, as well as papers on various aspects of ornithology.

Bulletins of news items, including the Society's *Newsletter* and *Ornithological Bulletin,* are sent to members throughout the year.

### Indoor meetings

These are held in most weeks throughout the year, with lectures, discussions, colour slides and films on all aspects of natural history.

### Field meetings

Led by experts to visit interesting localities, both within and outside our Area. These excursions are very popular with beginners wishing to increase their knowledge, and enable members to get to know one another.

### Library

A large selection of books and journals on most aspects of natural history is available for loan or consultation by members free of charge.

### Reading circles

Many important natural history journals are circulated by the Sections at a fraction of the cost of subscribing direct.

## SUBSCRIPTIONS

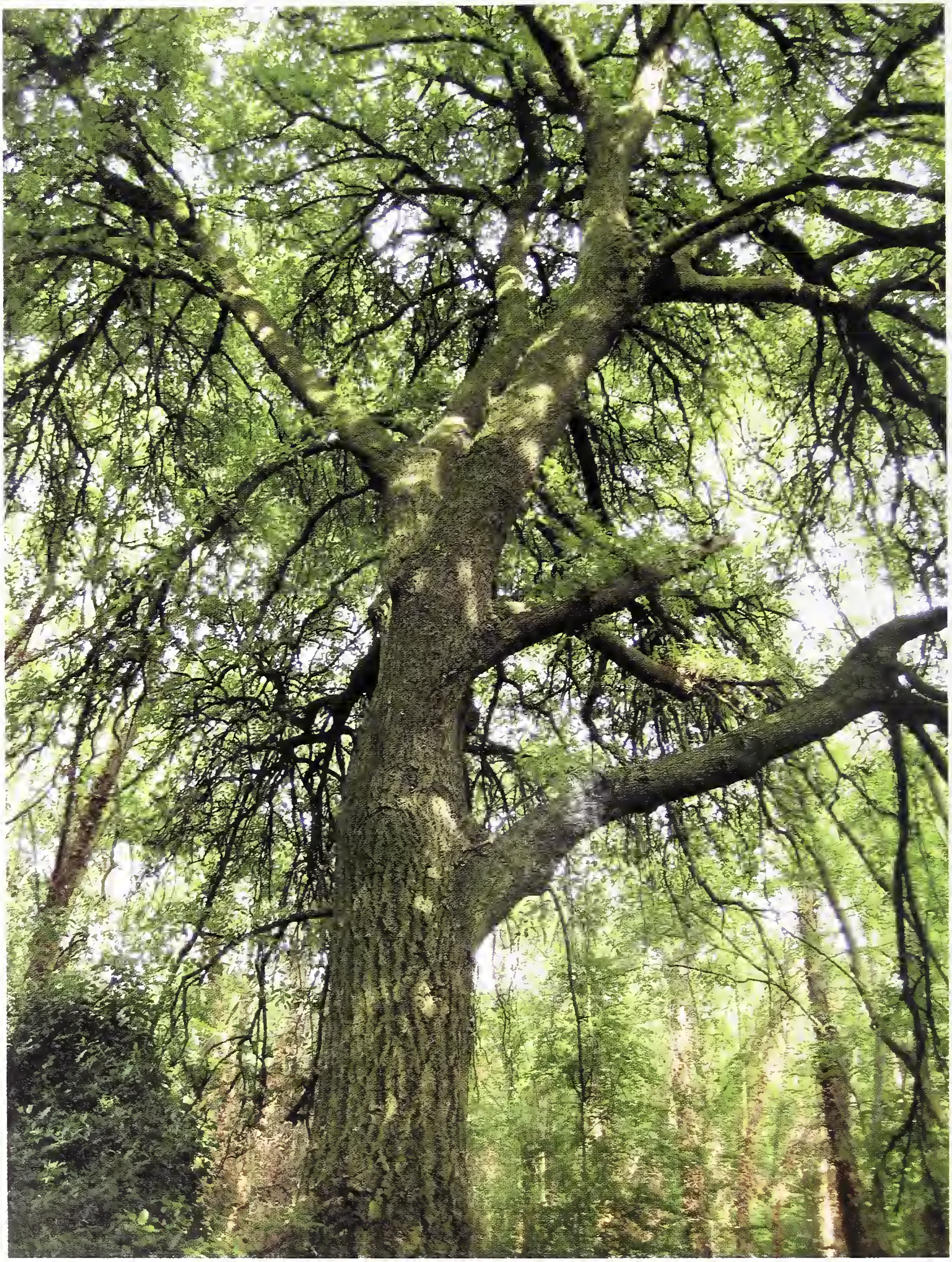
| | |
|---|---|
| ORDINARY MEMBERS | £20.00 |
| STUDENT MEMBERS | £5.00 |
| SENIOR MEMBERS | £16.00 |
| FAMILY MEMBERS | £4.00 |
| CORPORATE SUBSCRIBERS | £20.00 |

Student membership is for persons under 18 or receiving full-time education, and senior membership is for persons over 65 who have been continuous members of the Society for ten complete years. All except family members receive one free copy of *The London Naturalist* and the *London Bird Report* each year. Cheques and postal orders, payable to the London Natural History Society, should be addressed to

The Assistant Treasurer, LNHS,
Robin Blades,
32 Ashfield Road, London N14 7JY

## THE LONDON NATURALIST

Further copies of this issue of *The London Naturalist* may be obtained (price £8 plus £1 postage and packing) from Catherine Schmitt, 4 Falkland Avenue, London N3 1QR. Back numbers of most recent issues of both *The London Naturalist* and *London Bird Report* are also available from the same address. Cheques should be made payable to the London Natural History Society.



Fulham oak *Quercus* × *hispanica* 'Fulhamensis': one of several rare oaks in Abney Park Cemetery.
*Photo: R. Miller*

# THE LONDON NATURALIST

Journal of the
LONDON NATURAL HISTORY SOCIETY

## No. 87

for the year 2007

Edited by K. H. Hyatt

Readers are respectfully advised that the publication of material in this journal does not imply that the views and opinions expressed herein are shared by the editor, the London Natural History Society, or any party other than the named author or authors.

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# LONDON NATURAL HISTORY SOCIETY

**Founded 1858**

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92 Fellows Road, London NW3 3JG

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**Editor,** *Newsletter:* Ms E. Hinton, 33 Walker House, 11 Odessa Street, London SE16 7HD.

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† Deceased January 2008.

# The Society's Recorders

## Botany

**Flowering plants and vascular cryptogams:** Dr M. Spencer, 72 Michael Cliffe House, Skinner Street, London EC1R 0WX (020-7837 1471).

**Lichens:** Ms A. J. H. Waterfield, B.SC., 29 Gloucester Crescent, London NW1 7DL (020-7267 8060).

**Fungi:** Prof. E. G. D. Tuddenham, 17 Bedford Road, London N22 7AU (020-8374 5167).

**Bryophytes**: Dr M. C. Sheahan, 61 Westmoreland Road, London SW13 9RZ (020-8748 4365).

## Ecology and Entomology

**Mammals:** C. Herbert, 67a Ridgeway Avenue, East Barnet, Hertfordshire EN4 8TL (email: armconservation@hotmail.com).

**Reptiles and amphibians:** T. E. S. Langton, B.SC., 12 Millfield Lane, London N6 6RA (email: t.langt@virgin.net).

**Fishes:** Vacant.

**Arachnida:** J. E. D. Milner, B.SC., 80 Weston Park, London N8 9TB (email: spiders@acaciaproductions.co.uk).

**Coleoptera (Carabidae and Coccinellidae):** P. R. Mabbott, B.SC., 49 Endowood Road, Sheffield S7 2LY (email: paulmabbott@blueyonder.co.uk).

**Coleoptera (Lucanidae and Buprestidae):** Dr D. S. Hackett, FRES, 3 Bryanstone Road, London N8 8TN (email: danielhackett@blueyonder.co.uk).

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**Lepidoptera (butterflies):** L. R. Williams, 34 Christchurch Avenue, Kenton, Harrow, Middlesex HA3 8NJ (email: leslie.williams1597@btinternet.com).

**Lepidoptera (moths), Syrphidae, and invertebrates not otherwise listed:** C. W. Plant, B.SC., FRES, 14 West Road, Bishops Stortford, Hertfordshire CM23 3QP (email: cpauk1@ntlworld.com).

**Orthoptera:** Vacant.

**Hymenoptera Aculeata:** R. W. J. Uffen, 4 Mardley Avenue, Welwyn, Hertfordshire AL6 0UD (01438 714968).

**Heteroptera:** Vacant.

**Odonata:** Neil Anderson, B.SC., 52 Beechwood Avenue, Greenford, Middlesex UB6 9UB (email: neil@anders42.freeserve.co.uk).

**Plant galls, Isopoda and Myriapoda:** K. Hill, BA, FLS, 93 Elmhurst Drive, Hornchurch, Essex RM11 1NZ.

**Mollusca:** Vacant.

Records may be sent to the appropriate recorder (where shown) or to Colin Plant who will distribute to each recorder the relevant data from a mixed set of records.

## Geology

Vacant.

## Ornithology

**Inner London:** D. McKenzie, 28 Braithwaite Tower, Hall Place, London W2 1LP.

**Hertfordshire:** Joan Thompson, 73 Raglan Gardens, Watford, Hertfordshire WD19 4LJ.

**Buckinghamshire:** A. V. Moon, 46 Highfield Way, Rickmansworth, Hertfordshire WD3 2PR.

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**Surrey and Upper Thames (London Bridge to Staines):** S. Spooner, 32 Berkeley Drive, West Molesey, Surrey KT8 1RA.

**Middlesex:** M. Pearson, 48a Stamford Hill, London N16 6XT.

**Essex:** R. Woodward, 62c High Street, Cheshunt, Hertfordshire EN8 0AH.

Requests for information should be made to the appropriate recorder.

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# Report of the Society for the year ending 30 June 2007

**Approved at the Annual General Meeting on 28 November 2007**

This was the first full year of operation of the new Rules, which came into force on 6 December 2005 and were printed in *The London Naturalist* **85** (2006). Members of Council are the Trustees of the Society. Officers, and ten other members, are elected at the Society's Annual General Meeting. Three Sections (Botany, Ecology and Entomology, and Ornithology) and two Survey teams (Bookham Common and Hampstead Heath) manage their own affairs. Each is represented on Council by a member elected at their AGMs. Council meets quarterly, delegating much day-to-day business to the Administration and Finance Committee. Details of the appointed officers of the Society, and of the sectional and survey officers, appear in the *Programme* which is published twice a year. All these posts are voluntary and unpaid. Members interested in helping the Society in any way, perhaps by standing for election to Council or Committees, by assisting appointed officers, or by volunteering for one of the necessary, and often very rewarding, tasks which arise from time to time, are encouraged to contact the Society's secretary.

## Objectives

The Society aims to promote the conservation and study of natural history in the London area and to record the species and habitats found there. Its objects and activities should satisfy the 'public benefit' test under the Charities Act 2006. The new Rules are intended to meet this requirement and Council will review their operation to ensure they do so.

## Council actions

A review of policy on recording, mentioned last year, was completed, and Council approved the new Records Policy in April. It states the reasons for recording ('. . . for scientific and nature conservation reasons, for educational purposes, in the pursuit of knowledge, and for the enjoyment gained . . .'), notes that the relevant section committee appoints recorders, and defines their duties and responsibilities. It acknowledges that while ownership of records remains with the individuals who made them, the Society may do as it thinks fit with records supplied to it. Records may, at the discretion of each recorder, be supplied to the local records centre, Greenspace Information for Greater London (GiGL), under the terms of an agreement between the Society and GiGL. Datasets that have been supplied in this way are those for vascular plants, fungi, dragonflies and damselflies; others are in hand. Recorders also have the opportunity to verify and validate records submitted to GiGL by other organizations and individuals. Council is greatly appreciative of the invaluable work its recorders do for the Society and the wider natural history community.

In this context, last year's report mentioned a number of card index files of pre-1988 bird records, now stored at the London Wildlife Trust. The task of transferring these to digital form for input to GiGL has been begun by David Allen; volunteers to assist him would be very welcome.

Council approved a revised Memorandum of Understanding with the London Biodiversity Partnership, of which the Society is a founder partner.

Following their removal from Imperial College in December 2006, the Society's archives were deposited with the London Metropolitan Archives, where after conservation and cataloguing they will be available to members and the general public.

Also in December 2006, the Society's library was transferred from Imperial College to the Natural History Museum for temporary storage, pending discussions about the inclusion of the collection within Darwin Centre Phase 2 at the Museum where it would become a key resource for the UK Centre for Biodiversity. The library, which remains the property of the Society, has been valued and insured. Linda Hewitt, our librarian, continues to acquire material considered essential for maintaining the collection's continuity and completeness.

Colin Plant, entomologist and a vice-president of the Society, received the British Naturalists' Association David Bellamy Award in 2007. Colin's monograph *The Moths of Hertfordshire* is to be published by the Hertfordshire Natural History Society, and after the end of the financial year Council approved a grant of £1,000 towards this project.

Nearly fifty years ago the Society produced a full-length 16-mm cine film, 'London's Birds', a copy of which is in the National Film Archive. Arrangements are in hand to transfer it to DVD, allowing this historic film to be seen by a new generation of naturalists.

The Society's origins can be traced to the founding of the Haggerston Entomological Society in June 1858. The anniversary will be marked by several events, intended to explore the Society's role in circumstances very different from those of mid-Victorian England, as well as to celebrate the achievements of the past 150 years. In June 2008, a selection of articles reprinted from the Society's journals will be published, with commentaries describing their historical context and current significance. The major event will be a one-day conference on 'London's Natural History — past, present and future' at the Linnean Society on Saturday 11 October. The proceedings will be published in *The London Naturalist*. Other activities are planned for members and their families.

The Society submitted two applications for external support during the year: to the Esme Fairbairn Foundation (jointly with the Botanical Society of the British Isles), for funding an alien plant mapping scheme, and to Awards for All (Heritage Lottery Fund), to fund outreach activities in connection with the sesquicentenary. Unfortunately, neither was successful. The first may be resubmitted in a revised form while Council will consider what aspects of the second can be supported from the Society's resources.

## Membership and communication

Sixty-six new members joined during the year. The membership currently stands at 942, compared with 951 at the same time last year and continuing the slow decline of recent years. This is a trend affecting all natural history societies, in Britain and abroad. Council heard a presentation by Dr Oliver Cheesman, chairman of Invertebrate Link, on the subject of enthusing the young and recruiting our successors. This theme, closely related to the 'public interest' issue mentioned above, will be addressed by Council in the coming year.

We record with regret the deaths of Dr Ian Menzies (member since 1989, honorary vice-president and chairman of the Bookham Common Survey), Paul Moxey (1957), Ken Page (1979) and Terry Smeeton (1964), whose obituaries appear in this issue; and of Mike Dennis (1976) whose obituary appeared last year. We note also, with regret, the deaths of Brian Elson (1989), Michael Evans (1990), Mr M. Gladman (2006), Miss Helen Hartley (1986), John Hodge (2000), Geoffrey Taylor (1946), Dick Walker (1976) and Jack Wimberley (1983).

Under its new manager, Marc Carlton, the Society's website http://www.lnhs.org.uk has been wholly restructured and is now the primary source of information and updates on activities. One useful feature is the introduction of a facility allowing members and the general public to submit comments and questions. The members-only website http://tech.

groups.yahoo.com/group/LNHS-members has proved useful for internal communication and discussion. The two-monthly *Newsletter*, now edited by Emma Hinton, is much appreciated. A membership list, the first for several years, was distributed with the *Newsletter* during the year. Copies are available from the Secretary.

**Publications and journals**

Last year's report noted Council's concern over delays to the *London Bird Report* and plans for a double issue to remedy this. *LBR* **67/68** for 2002 and 2003 was published during the year, the sequence of species accounts being reordered to accommodate nomenclatural changes. The editor, Andrew Self, has included an impressive section of colour plates. *The London Naturalist* **85** for 2005, edited as usual by Keith Hyatt, appeared early in 2007. At 264 pages it is the largest volume yet published, with eighteen substantial articles as well as obituaries and the usual book reviews and Society reports. Bibliographers should note that the printed publication date of both journals is 2006.

Publication of *The beetles of Bookham Common* has been delayed until 2008.

Catherine Schmitt handled sales of back numbers, and to non-members, as follows: *London Bird Report*, 33 copies; *The London Naturalist*, 45; occasional publications, 87.

**Members' activities**

The number of field meetings organized by the Sections — over a hundred, with Botany accounting for 22, Ecology & Entomology 26 and Ornithology 53 — showed a small increase on last year. The Society participated in 'London's Heathland Heritage' project and Council's representative, Mick Massie, ensured that a number of heathland sites were visited. Other meetings were organized jointly with Butterfly Conservation, Conchological Society, British Plant Gall Society and BSBI, and with local societies and Wildlife Trusts. Topics for Field Study Days at Bookham Common included spiders (Oliver Crundall) and grasshoppers (Ian Menzies and Gavin Hawgood).

More than twenty indoor meetings were held, including the first of what is hoped will be an annual series organized jointly with London and Middlesex Archaeological Society. The inaugural lecturer at the Museum of London was Dr Ian Tyers of Sheffield University whose subject, 'Tree ring searches — environment and dating' was highly relevant to the story of London and the Thames.

## Treasurer's report for 2006/2007

At the end of the financial year on 30 June 2007, the total net assets of the Society were £332,663 compared with £347,016 the previous year.

Income for the year totalled £37,253 compared with £36,465 in 2005/2006. Subscription income (including Gift Aid tax recovered) decreased from £20,152 in the previous year to £19,639 in 2006/2007. Sales of the Society's various publications generated £909, compared with £1,253 in the previous year. The Society's investment in the COIF Charities Deposit Fund generated interest of £15,706 (at an average rate of just over 4.9 per cent).

Overall expenditure during the year was £50,616 compared with £31,978 in the previous year, due mainly to costs associated with the removal of the Society's library from Imperial College, and writing of *London Bird Report* 2002–2003 in an attempt to reduce the backlog in production of this journal.

**Reserves policy**

The Society's unrestricted general funds can be regarded as expendable endowment since they are invested to provide a regular source of income as well as capital growth, over time.

**Statement of trustees' responsibilities**

Law applicable to charities in England and Wales requires the trustees to prepare financial statements for each financial year which give a true and fair view of the charity's financial activities during the year and of its financial position at the end of the year. In preparing those financial statements the trustees are required:

- to select suitable accounting policies and then apply them consistently
- to make judgements and estimates that are reasonable and prudent
- to state whether applicable accounting standards and statements of recommended practice have been followed subject to any departures disclosed and explained in the financial statements; and
- to prepare the financial statements on the going concern basis unless it is inappropriate to presume that the charity will continue to operate.

The trustees are responsible for keeping accounting records which disclose with reasonable accuracy at any time the financial position of the charity and enable them to ensure that the financial statements comply with the Charities Act 1993. They are also responsible for safeguarding the assets of the charity and hence for taking reasonable steps for the prevention and detection of fraud or other irregularities.

## Summarized accounts for the year ended 30 June 2007

These summarized accounts have been extracted from the Society's annual accounts for 2006/2007. They may not contain sufficient information to provide a full understanding of the financial affairs of the Society. For further information on the full accounts, the Independent Examination report on these accounts and the trustees' annual report should be consulted. Copies can be obtained from the Hon. Treasurer, M. J. West, 52 Trinity Road, Ware, Hertfordshire SG12 7DD.

The full annual accounts were approved by the trustees on 9 October 2007.

**Accounts follow:**

# Summarized statement of financial activities for the year ended 30 June 2007

| | Unrestricted general funds 2007 £ | 2006 £ |
|---|---|---|
| **Incoming resources** | | |
| **Incoming resources from generated funds:** | | |
| ***Voluntary income:*** | | |
| Subscriptions received from members | **19,639** | 20,152 |
| Donations and other income | **526** | 850 |
| ***Investment income:*** | | |
| Interest receivable | **16,179** | 14,210 |
| ***Incoming resources from charitable activities:*** | | |
| Publications/ journals income | **909** | 1,253 |
| **Total incoming resources** | **37,253** | 36,465 |
| **Resources expended**: | | |
| Charitable activities | **46,131** | 27,546 |
| Governance costs | **5,475** | 4,432 |
| **Total resources expended** | **51,606** | 31,978 |
| **Net movement in funds** | **(14,353)** | 4,487 |
| Fund balance brought forward at 1 July | **347,016** | 342,529 |
| **Fund balance carried forward at 30th June** | **£332,663** | £347,016 |

# Balance sheet as at 30 June 2007

| | 2007 £ | 2006 £ |
|---|---|---|
| **Fixed assets** | | |
| Tangible fixed assets | **1,633** | 3,133 |
| **Net current assets (including cash deposits)** | **331,030** | 343,883 |
| **Total net assets** | **£332,663** | £347,016 |
| **Represented by:** | | |
| Unrestricted funds | **£332,663** | £347,016 |

# Official and sectional reports for 2007

## CONSERVATION

The year 2007 was one of considerable change and development for the London Biodiversity Partnership (LBP), of which our Society has always been an important and active partner. Following the launch of GiGL (Greenspace Information for Greater London — www.gigl.org.uk) in April 2006, it was decided that their developing dataset (important elements of which are provided by LNHS recorders) would make a much stronger and more robust 'evidence base' for monitoring change in London's biodiversity than the previously used GLA habitat inventory.

In early 2007, LBP submitted a series of habitat creation and enhancement targets for 2015 for incorporation into the London Plan. These targets, which LBP felt to be 'challenging but achievable', have now (with one exception) been formally endorsed by the GLA and will be incorporated into the London Plan. The targets will form the basis of the work plans for the relevant habitat working groups. The exception (disappointingly, but perhaps unsurprisingly) was that for wastelands. Natural England has also adopted these targets, which now represent London's contribution towards the UK's national ambitions for habitat enhancement to be achieved by 2015. The adoption of these targets into the London Plant was a great success for LBP, and it indicates to strategic planners the Partnership's continuing commitment to securing substantive biodiversity gains for London.

During the course of the year LBP reviewed all London's existing habitat and species action plans. The purpose of the review was to establish whether there were any gaps in coverage; to examine the anticipated impact of climate change; and to set in train any actions required to achieve the habitat creation targets discussed above. As a consequence, a new Standing Water HAP has been created (led by Froglife) and the Canals HAP and the Grey Heron SAP have been merged within it. The potential of a new Built Environment HAP was investigated, which could incorporate the existing black redstart and peregrine falcon SAPs. The Woodland HAP will be expanded to encompass ancient/veteran trees (previously not covered). The Churchyards and Cemeteries HAP will be merged with the Parks and Greenspaces HAP, and the Rivers and Streams HAP will incorporate a new Floodplain Grazing Marsh sub-group.

Owing to some discrepancies between the GLA's Habitat Survey methods and the BAP Habitat definitions (and with a lack of survey data for the London Borough of Bromley), LBP's work has been hampered by imprecise data on the location of some of London's habitats. Working in conjunction with GiGL, LBP made good progress with developing accurate baseline maps showing the detailed distribution of these habitats. LBP will shortly have these maps available for dissemination to boroughs and others for cross-checking the locations of existing habitats. In addition, LBP has had no method of determining the *condition* of such habitats. The habitat working groups have been working with GiGL to devise a rapid condition assessment methodology. This will be based upon available habitat condition to be made. This too will be disseminated and regularly updated. These methodologies will enable LBP, for the first time, to give an indicative assessment of habitat condition, and to provide baseline data against which to monitor future progress. The use of species data for this process is fundamental, and demonstrates the value of records data to LBP.

A 'new look' LBP website was developed during the latter part of 2007 (launched January 2008). This is intended to make it easier for non-experts, and those whom LBP is seeking to influence (such as planners and developers), to access information. The site is still being updated but can be visited at the same address — www.lbp.org.uk

Peter Massini stood down as chair of LBP over the summer, and was replaced by Paul Forecast from the RSPB. Paul has himself now stood down (March 2008), and Andrew Jones, GLA Biodiversity, Noise and Waste Manager, was elected as his replacement.

In early 2007 there was considerable uncertainty over the future funding of the LBP 'secretariat' function post 2008. The secretariat consisted of the Partnership Manager and a part-time Funding Manager, and was based at the London Wildlife Trust. The posts were funded by Defra and Natural England, but that funding was due to expire at the end of March 2008. Natural England offered to employ the Partnership Manager as a member of their staff (paid for by them) from 1 April 2008, but did not have funds to employ a Funding Manager. The LBP Board accepted Natural England's offer and, from that date, the Partnership Manager became a Natural England employee based in Ashdown House (the NE office). The Fundraising Manager's contract was not renewed.

Work on the Capital Woodland Project, funded by the Heritage Lottery Fund, continued throughout London. In Coldfall Wood in Haringey, one of the Project's six 'flagship' woodlands, the dramatic changes in the flora, following the previous year's coppicing, were carefully monitored. By the end of the year, an additional 105 plant species had been recorded from the coppiced area. These included a number of London rarities, such as pale sedge *Carex pallescens,* bristle club-rush *Isolepis setacea,* and slender St John's-wort *Hypericum pulchrum.* These plants are likely to have survived in the seed-bank since the Wood was last coppiced in the 1930s.

Freda Turtle, Secretary to the Nature Conservation Working Group, has now retired after many years of devoted work. I am personally very grateful to her for all the support she has given me, and the Society has greatly benefited from the valuable survey work that she and the Working Group have carried out over the years — she will be very much missed.

I am grateful to Nick White, LBP Partnership Manager, for information concerning LBP's work.

David Bevan, *Conservation Officer*

## BOTANY

The Botany Section has had another busy year. At the AGM in November 2007, Matthew Frith, vice-chairman of the London Wildlife Trust gave a wide-ranging talk entitled: 'Tales from the Tempest: twenty years after the Great Storm, what lessons have been learnt for London's biodiversity?' Matthew explained that the Great Storm of October 1987 marked a shift of focus in policy and practice regarding the management of trees and woodlands. A quarter of a million trees were lost and many mistakes were made by trying to 'tidy up in the aftermath'. Nonetheless, the storm did trigger 'an audit of what existed and what we did not want to lose'. This documentation was undertaken by a number of organizations including the Countryside Commission and the London Ecology Unit. Matthew gave an overview of the changes in woodland management since the 1980s, reflecting the increased level of interest in woodland conservation. This led to the establishment of the National Forest and a marked shift in the policies and practice of major institutions, in particular the Forestry Commission. He concluded that many woodlands are now in much safer hands than they were twenty years ago, but he also highlighted some of the current challenges. The interest in trees as a symbol of nature conservation has sometimes led to an overemphasis on tree planting, which is invariably equated with environmental good practice (though, if carried out in the wrong place, can be ecologically damaging). The increasing need for housing is likely to create difficulties in sustaining biodiversity, especially in the face of climate change. Mathew's talk was well received and resulted in many questions.

There were no formal indoor meetings in the first half of 2007, but there was a busy schedule of informal ones. These included the traditional 'best botanical photographs' for 2006; a talk by Dr Mark Spencer on 'Vanishing Plants of the Thames Corridor' (marsh sowthistle *Sonchus palustris* and triangular club-rush *Schoenoplectus triqueter*); a plant quiz run by George Hounsome and John Swindells; and a talk by Dr Fred Rumsey on bluebells. Additionally the School of Horticulture at Kew hosted a members' evening to practice the use of dissecting and compound microscopes. One informal indoor meeting was held in the summer, when Rodney Burton guided members on the intricacies of identifying yellow composites. Rodney continued to arrange the indoor meetings for 2007 but, as he had previously announced, he resigned at the end of the year. We are most grateful for all his hard work in this role, and for the outstanding range of speakers that he has managed to recruit for us over recent years.

Thanks to the energetic work of our Field Meetings Secretary, George Hounsome, we had another full programme — with visits in the early part of the year to Norbury Park, Box Hill and Mickleham, Bookham Common (for bryophytes), Wimbledon Common (for fungi identification), and there was a recording day at London Zoo. We also visited Blackheath (for clovers), and Chertsey Meads. In June, there were visits to Rowley Green, Riddlesdown, Aston Rowant NNR, Camden and Camley Street Nature Park, and Coalhouse Fort near Tilbury. At the end of the month there was a 'pot luck' evening visit to the East End. In July we visited Farthing Down to record for the Rare Plants Register, paid an evening visit to Queen's Wood, went to Ranscombe for its rich arable weed flora, and assisted the Herts and Middlesex Wildlife Trust in recording the flora of Stockers Lake and Old Park Wood. The poor weather throughout the summer meant that some of the meetings were less well attended than usual. Conditions improved in the autumn when there were visits to the Thames towpath from Hampton Court, and to the Borough of Lambeth where a remarkable range of 'street weeds' was found. We studied the ferns of Moat Mount Open Space, and finally Professor Ted Tuddenham led the annual Haringey fungus foray when, despite continuous rain all day, a gratifyingly large number of ceps *Boletus edulis* were found (and consumed back at Railway Fields at the end of the day).

Following Rodney's decision to stand down as LNHS vascular plant recorder and the appointment of Dr Mark Spencer as his successor, Rodney and Mark worked together during 2007 to ensure the smooth hand-over of records (both digital and paper/card index) and the small library of county floras and associated pamphlet/report-based literature. Rodney is continuing to work upon the Rare Plant Register that was already under way prior to his resignation. Mark's botanical activities were somewhat curtailed by the extremely wet summer and an extended period of ill health. He nevertheless made a number of unusual botanical discoveries, and has taken over from Rodney the task of collating records from other members of the Society. Mark is very interested in the now rapidly changing, non-native flora of London and encourages members to look out for such plants and to submit records, either to him directly (Lnhs_plant_recorder@hotmail.co.uk), or via the BSBI website (http://www.botanicalkeys.co.uk/flora/content/record/recording.htm). Alternatively, for those who have a larger dataset and use Mapmate, the data can be 'synched'. Those who have observations and data in other formats should contact Mark to discuss how these can be transferred. Records become more valuable when combined with other datasets, and the more such data we have, the greater will be our ability to understand the impacts of London's changing environment upon its flora.

Amanda Waterfield hopes that the publication in last year's *London Naturalist* (**86**: 143–174) of her paper on foliose and fruticose lichen records, and a checklist of crustose lichens in the London Area, may prove useful for members who wish to record their own areas. She is still working on collating past records, and is keen to receive any new ones to add to her database.

Dr Mary Clare Sheahan reported on bryophyte visits to Bookham Common, Trent Park, Wimbledon Common, Hounslow Heath and Oxleas Wood in West Kent. Members also had an opportunity to study bryophytes microscopically at the indoor meeting already mentioned, which was held at Kew in January. Mary Clare herself attended an advanced course on the use of Mapmate to improve the efficiency of data inputting, which is, however, still very slow. Once again she stresses that she would be very pleased if members of the Botany Section would continue to send her their bryophyte records.

Professor Ted Tuddenham reported on fungus forays in the spring on Wimbledon Common, focusing on microfungi with the help of Brian Wurzell; and the Grand Annual Foray in Haringey, which included Coldfall Wood for the first time. While the spring was exceptionally dry, the summer was the wettest on record. However, this did not seem to produce many additional larger fungi in the sites that Ted visits or in terms of reports from members. He noted that the first autumn foray attended by our members was held in Trent Park on 14 October under the auspices of the newly formed Greater London Fungi Group of the Association of British Fungus Groups (ABFG). This group was set up early in the year by the keener mycologists among our membership with guidance from Michael Jordan. A criterion for running an ABFG group is that there should be six autumn forays for members, with a serious attempt to help all to develop their taxonomic skills including, if possible, a microscopic session following each field outing. Ted has become leader of this group and proposes to include the LNHS forays in the ABFG calendar where appropriate. The activities of this group will make a large contribution to recording London fungi as well as to the development of our skills. The core group of fungi enthusiasts has grown and includes several experts in various areas, who are helping with recording. Ted is particularly grateful to Keir Mottram, Dr Mark Spencer, Helen Thomas, Mary Rawitzer and Jo Dubiel for their support of this activity.

DAVID BEVAN, *Chairman*, SARAH GRAHAM-BROWN, *Secretary*

## ECOLOGY AND ENTOMOLOGY

At February's informal meeting members showed slides on various aspects of the natural world. In March we were presented with a double-barrelled talk by two members of Buglife on 'Bumblebees and Brownfield Sites': Greg Hitchcock spoke of brownfield sites, especially in the Thames Gateway, and Diana Cheng explained their significance for bumblebees with special reference to the proposed survey over the coming summer. For our annual joint meeting with the British Entomological and Natural History Society in September, Oliver Cheesman, Chairman of Invertebrate Link, gave the Brad Ashby Memorial Lecture on 'A history of insect conservation in Britain'. In October our AGM consisted of the now-traditional format of reports from Recorders — four in person, five by written reports, with a lively discussion on each. In November Nigel Reeve, Community Ecologist for the Royal Parks, spoke to us about 'Conservation in the Royal Parks'.

Twenty-one field trips were organized during the year to a wide range of habitats in various parts of our recording area to observe and record a variety of taxa. Mick Massie is building up a list of excellent leaders and productive sites. Some of these trips were joint with other organizations such as London Wildlife Trust and Butterfly Conservation. Two were joint with the British Plant Gall Society and Elmbridge Natural History Society, and another two with Hertfordshire Natural History Society.

Our Section's representation of the Society at the Amateur Entomologists' Society exhibition in October continues to attract interest from visitors from all over the country and, we hope attracts a few new members.

COLIN BOWLT, *Chairman,* CATHERINE SCHMITT, *Secretary*

## ORNITHOLOGY

The Ornithology Section enjoyed a successful year with well-attended indoor meetings on bird identification, field trips to amazing birding sites close to London almost every weekend, and coach trips to well-known birding areas and a successful stand at the Lee Valley Bird Fair.

Our field meetings organizer, Neil Anderson, reported that coach trips had been well attended in 2007 and three had sold out with a waiting list, including the last two trips, and it was particularly pleasing to have many new faces. With such good attendance, there had been no need to increase coach prices. Despite a rise in coach hire costs due to fuel price increases, the account was in a healthy state. Neil had continued using the ABC coach company because it had competitive rates.

In January 2007, there had been a coach trip to Minsmere where waxwing, Bewick's swan, and otter were seen. At Dungeness in May hobbies and gannet were seen. At Strumpshaw Fen in June there were swallowtails, dragonflies and Cetti's warbler. In August at Titchfield Haven there were terns, garganey and waders. In October, at Elmley there was a long-billed dowitcher and six species of raptor including buzzard, peregrine and merlin. In December at Titchwell there were snow buntings, long-tailed duck, red-breasted merganser and golden plover. Do try a coach trip to improve your birdwatching skills and get to know other like-minded people.

The first part of the local trips programme was organized by Jennifer Hayden and the second part by Pete Lambert. There were forty-nine trips during this period, a remarkable number, and all led by volunteers from the LNHS. Some trips may only attract a handful of people, which is disappointing, but this does mean that you are more likely to have a good view than if there was a big crowd. The programme brings together a glimpse of what can be seen and enjoyed within a twenty-mile radius of London and further afield. The walks are all accessible by public transport and are led by very knowledgeable birdwatchers. Please turn up whatever the weather, as you can be confident that the leader will always arrive. We now give details in the *Programme* of toilet facilities at the sites, after a suggestion by a member. We do have bird walks for beginners in Regent's Park and at Fairlop Waters so please tell any friends who might be interested and bring them along. We also try to help with identifying bird song so again this is an area where novices might benefit hugely. Don't forget that we also try to identify insects or anything else of interest we come across. The arranged walks covered a variety of habitats and ranged from around local patches, such as Wandsworth Common, Wanstead Park, Walthamstow, Tooting Broadway, East India Dock Basin, Wimbledon Common and Cheshunt, to visits to bird reserves such as Rye Meads. Visits were also made to three places outside the LNHS recording area: Wat Tyler Country Park, Tilbury and Two Tree Island. Pete Lambert would to thank all the leaders of these walks.

The Ornithology indoor meetings enjoyed a very successful year, often with over thirty people attending. This may be helped by the fact that tea, coffee and cakes are offered beforehand. In January, we held a meeting on one of London's most notorious sites — the infamous Beddington Sewage Farm. Derek Coleman illustrated its past, present and possible future and showed us its extraordinary bird list over the years. This was followed, a few days later, by a field trip to Beddington led by Derek.

In September, our BTO representatives for North and South London, Ian Woodward and Richard Arnold, described the project for the new BTO Bird Atlas and asked for more volunteers. In October, our inexhaustible chairman, David Darrell-Lambert, gave a further talk aimed at improving our identification skills. This time he dealt with chats and thrushes. We are most grateful to David for providing these unique talks from which our Society has been the first to benefit. In November, Andrew Self gave a talk on his trip to find birds in northern and eastern Australia, and in December, Edward Meyer gave an enthusiastic talk on how to provide nests and shelter for swifts. The Committee welcomes suggestions for future talks and, in particular, would like to know whether members want more speakers on London areas or on particular topics.

The Records Committee had examined 209 records during the year, of which 130 were accepted, 77 rejected and two were still under discussion. Progress on the *London Bird Report* was unfortunately still slow and more help was required to move this forward and to bring our reports up to date.

The Ornithology Section has a Reading Circle. There are now only twelve subscribers compared with fifteen the year before. A flyer is sent out with the December LNHS *Newsletter* giving all the details. There is one new British magazine, *Birdwatch*, which is of popular interest. There are two Dutch periodicals, *Ardea*, a scientific journal and *Dutch Birding* (a magazine of more general interest), two UK periodicals: *Ibis*, a scientific journal for the UK, *British Birds* (of more general interest) and two periodicals for the rest of the British Isles, *Irish Birds* and *Scottish Birds.* Please contact Angela Linnell (020 8508 2932) if you are interested in subscribing to the Circle.

The Ornithology Section took a stall as usual at the Lee Valley Bird Fair in February 2007. The Fair attracts people from all over the country — we talked to people from Staffordshire and Suffolk as well as many Londoners. We handed out a list of local events from our programme and we also had leaflets advertising the coach trips and the indoor meetings. Mike Trier had produced a large banner with 'LNHS' on it to identify our stall. Mike had brought the LNHS computer and the screen and he set up the display so it was projected onto the back wall. He had set up three items on the Society: one on the LNHS Website, one on David Darrell-Lambert's talk on identifying pipits and wagtails from the previous Monday's indoor meeting, and one with the slide show of natural history photos which we had used before. The computer worked very well on the Saturday but failed on Sunday morning, when the organizers had their usual problems with the generator (caused by exhibitors plugging in their own kettles, we understand!).

We tried to sell as many LNHS publications as we could — unfortunately, we did not receive the new *London Bird Report* for 2002/3 in time for the fair, However, Andrew Self, the editor, had sent us an attractive poster with the timetable for the printing the 2002–5 reports, which helped us to explain the delay. We also had some second hand books on sale.

We would like to encourage all members to try the field trips and bring their friends, to show them just what is available on London's doorstep. Some field trips are attended by only a handful of people but there is so much to enjoy so close to home. The indoor meetings in the winter have been very well attended and have elicited very enthusiastic responses to the talks, particularly those given by our former chairman, David Darrell-Lambert.

If you have any suggestions for field trips, indoor meetings or any ways to improve the service or attract more members, please contact us.

DAVID LINDO, *Chairman*, ANGELA LINNELL, *Committee Secretary*

# An introduction to freshwater algae

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**Presidential address delivered at the Annual General Meeting on 28 November 2007**

## Abstract

A brief introduction to the freshwater algae is given, with emphasis on those species found in the London Natural History Society's recording area.

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The algae are a diverse assemblage of mainly aquatic organisms that carry out oxygen-evolving photosynthesis and lack specialized water- and nutrient-conducting tissue. We recognize them when we see them: the green powder on the fence, the skein of blanket weed in the pond, the wracks of the seashore. They can be found pretty much anywhere at any time of the year; there are good beginners' guides, there is an excellent flora and, unlike many neglected groups, the freshwater algae are a delight to the eye.

Not only are they pleasant to look at, but we also owe our existence to them; they created and sustain our atmosphere. Fossils of filamentous photosynthetic blue-green algae have been dated at 3.4 billion years old (Mulkidjanian et al. 2006), appearing soon after the earth cooled down after the Hadean (about 4.6 to 3.8 billion years ago).

Approximately 2,000 million years ago the algae increased the concentration of atmospheric oxygen on our planet from about 0.2 per cent to around 20 per cent. Without this concentration of oxygen, animals would have never evolved (Farquhar et al. 2000).

Most photosynthesis on land is carried out by higher plants, but terrestrial photosynthesis has little effect on atmospheric oxygen because it is nearly balanced by the reverse processes of respiration and decay. The algae, particularly the planktonic marine algae, are a net source of oxygen because a small fraction (~0.1 per cent) of the organic matter synthesized in the oceans is buried in sediments. This small leak in the marine organic carbon cycle is responsible for nearly all of our atmospheric oxygen and amounts to 300 billion tonnes a year (Kasting and Siefert 2002).

Not only do we rely on them now, but we will need them in the future. Algae are a potential source for biofuels, with pilot plants already operating. Most research into producing fuel from algae is on biodiesel, bioethanol and biobutanol as automotive fuels to replace petrol (Sheehan et al. 1988). Sheehan et al. stated: 'Put quite simply, microalgae are remarkable and efficient biological factories capable of taking a waste (zero-energy) form of carbon ($CO_2$) and converting it into a high density liquid form of energy (natural oil).' But they concluded that, even with the most optimistic lipid yields, the production of biodiesel from algae would only become cost-effective if oil prices rose to twice the 1998 levels ($11.55 a barrel for crude). Oil prices were that by November 1999 ($23.14) and reached $100 on 2 January 2008.

The bulk of the natural oil from algae is in the form of triacylglycerols and is mixed with alcohol, usually methanol, to form biodiesel. A more interesting prospect is *Botryococcus braunii*, a colonial alga found worldwide and common on the margins of ponds and in the chalybeate springs on Hampstead Heath. The green pigment of the colonies is often masked by orange-brown oils which ooze out if the alga is subjected to pressure. These hydrocarbon oils, the triterpenoids isopentyl diphosphate and dimethylallyl diphosphate, have been hydrocracked to produce a distillate comprising 67 per cent a petrol fraction, 15 per cent an aviation turbine fuel fraction, 15 per cent a diesel fuel fraction and 3 per cent residual oil (Hillen et al. 1982). Hydrocarbons make up 75 per cent of the dry weight of *B. braunii*, against a range for other algae of 20–40 per cent dry weight (Metzger and Largeau 2005).

Algae grow much faster than terrestrial crops and can produce up to thirty times more oil per unit of growth area than land plants (Haag 2007). They can also produce hydrogen or methane (Benemann 2004).

The algae are certainly useful, but what exactly are they? There is no simple answer. The term 'algae' is as taxonomically meaningless as the term 'tree'. Only whereas trees belong to many different orders and families in the plant kingdom, the algae span whole phyla; they bestride the greatest division of all: between the prokaryotic and eukaryotic worlds, namely between those organisms that have a nucleus and those that do not. In the classic two-kingdom system the algae are in the plant kingdom. But even here, algae such as *Euglena* have been placed in either kingdom depending on whether a taxonomist thought their power of rapid movement made them animals or their photosynthetic ability made them plants.

In the five-kingdom system of Monera, Protista, Plants, Animals and Fungi (Whittaker 1969), the prokaryotes have their own kingdom as the Monera, and this includes the Cyanophyta, the blue-green algae. The other, eukaryotic, algae are in the plant kingdom. But still they refuse to conform; the diagnostic characteristics of the algae may be ill-defined, but they are clearly different from the well-defined traits of the bryophytes and vascular plants. Nor do the blue-green algae fit comfortably with the bacteria in the Monera; they possess unique photosynthetic pigments not found in the rest of the kingdom, and they release free oxygen as a by-product of photosynthesis.

Some biologists want the eukaryotic algae to be placed in the kingdom Protista — a notorious dumping-ground for all eukaryotes that do not fit the definitions of plants, animals or fungi — with only a few multicellular phyla in the plant kingdom. Woese et al. (1977) suggested a six-kingdom system, splitting Monera into Eubacteria and Archaebacteria (and for good measure Woese et al. (1990) proposed another system, of three 'domains').

The most recent proposal is for an eight-kingdom system (Cavalier-Smith 1993), informed by genetic and ultrastructural studies. It assumes that the Archaebacteria (the primitive bacteria often called extremeophiles from their inhospitable habitats) diverged from the main eubacterial lineage early in the history of life. The Eubacteria, which contains the Cyanophyta, then remained stable for millions of years before forming the oldest member of the Eukaryota, the superkingdom Archeozoa. This superkingdom in turn evolved to give rise to superkingdom Metakaryota, the most basal member being the kingdom Protozoa. Within the Metakaryota are the four higher eukaryotic kingdoms derived from the Protozoa: the kingdoms Plantae, Animalia, Fungi and Chromista. In the eight-kingdom system the algae are dispersed, with the green and red algae in the plant kingdom and the other (eukaryotic) algae in the chromist kingdom. Some have said that even eight kingdoms are not enough. An up-to-date treatment of algae systematics is given by Brodie and Lewis (2007) in a volume which distils a two-day symposium on the subject held in 2006.

Most phycologists, at least in the field, are happy with the simplest basis for a high-level classification: colour. The Irish botanist William Henry Harvey (1811–1866) was the first to divide the algae into four divisions based on their pigmentation — and hence the first to use a biochemical criterion in plant systematics. Harvey divided them into the red algae (Rhodophyta), brown algae (Heteromontophyta), green algae (Chlorophyta) and diatoms (Diatomaceae). The conservative classification of the current UK flora (John et al. 2002) is adopted below.

## Cyanophyta (blue-green algae)

Our hopes of relying on colour run into difficulty straight away. The blue-green algae are not always blue-green; they can be olive brown, black or even rose-pink.

There are about 150 genera of blue-green algae with approximately 2,000 species and they have colonized a great variety of habitats from the splash zones of waterfalls or the sea-shore, to damp soil and the thin layer of moisture on sandgrains in deserts. Some burrow into shells, others live on or within lichens, plants or sponges, floating in the water or fixed to the stones, or on the mud, at the bottom. The blue-green algae are a spectacularly successful group.

In form they range from simple cells, often in a tough gelatinous sheath, to filaments and colonies. Some of the colonies are mere aggregations of single cells in a mass of jelly, such as *Microcystis*. Other colonial forms, such as *Gleotrichia*, are quite complex. A common filamentous form is *Oscillatoria*, which looks rather like a roll of pennies and is commonly found in puddles and ditches. It is able to move, with a smooth gliding motion, to orient itself to light.

The blue-green algae are very important for life on this planet, as they are the main organisms responsible for fixing nitrogen (Tyrell 1999). But because the enzyme responsible for reducing nitrogen (nitrogenase) is irreversibly inhibited by oxygen, the blue-green algae have had to evolve mechanisms or behaviour patterns to keep photosynthesis and nitrogen fixation apart. Some, such as *Anabaena*, do so by fixing nitrogen only in specialized cells called heterocysts. Others fix nitrogen at night and photosynthesize by day (Stöckel et al. 2008) or, like *Trichodesmium*, fix nitrogen in the morning and photosynthesize in the afternoon (Berman-Frank et al. 2001).

A few members of the Cyanophyta can become a nuisance when they form blooms — an explosive growth triggered by high nutrient or light levels. Some of these blooms are harmless, but when the algae produce toxins, they can cause the death of fish and cattle, and produce harmful conditions for humans.

The classification of blue-green algae has been the subject of an undignified tug-of-war between microbiologists and botanists since at least the days of Haeckel; his *The Wonders of Life* (1904) was the first to include the blue-green algae among the Moneras with the bacteria (Sapp 2005).

The blue-green algae are traditionally classified with the algae because their size and morphological diversity correspond to other algae, and they perform the same functions in nature. The microbiologists point out that the blue-green algae do not have a nucleus and should be classified with the bacteria. There are after all, some large bacteria that look like algae and are found in fresh water — the purple phototrophic bacteria, for instance.

However, the blue-greens do not fit comfortably with the rest of the bacteria, as explained above. Furthermore, they have been the object of study by botanists for so long that the species described are from herbarium specimens, rather than from cultures, as would be the case with bacteria. Who would undertake to culture (if possible) the specimens and redescribe them? To continue to use the International Code of Botanical Nomenclature may be to conceal 'a ramshackle edifice . . . behind an elaborate and imposing nomenclatural façade' as Roger Stanier (1974) wrote in a waspish review of G. E. Fogg et al. (1973) *The blue-green algae*, but there is no practical alternative on offer. We are forced to adopt the compromise of saying that they are bacteria on a molecular level, yet their ecology is that of the algae.

## Chlorophyta (green algae) (Figure 1)

This is the most visible group: the blanket weed of the pond and the green powder on tree-trunks and plant pots belong here. It contains about 350 genera and 8,000 species worldwide and shows a great variety in unicellular, colonial and filamentous forms.

The blanket weed genera include *Cladophora, Oedogonium* and *Spyrogyra. Oedogonium* is the commonest filamentous algae of ponds and ditches and *Spyrogyra* is the most widely distributed of all freshwater algae.

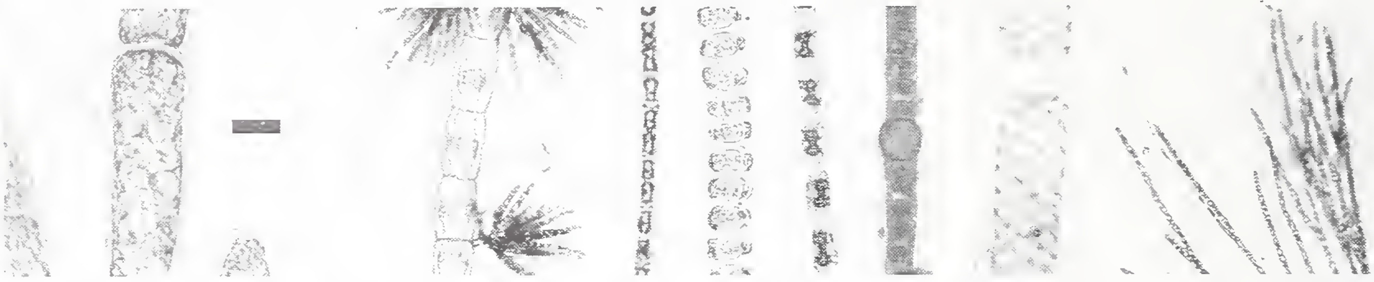

FIGURE 1. Filamentous green algae: (from left) *Cladophora glomerata, Draparnaldia glomerata, Microspora amoena* v. *gracilis, Ulothrix zonata, Zygnema pectinatum, Oedogonium crassum, Spirogyra* sp., *Chaetomorpha elegans*. Scale bar = 50 μm.

The order Chlorococcales contains many unicellular and colonial algae, several of which can turn the water in a pond green with their numbers. One can follow the increasing complexity from unicellular forms such as *Chlorella,* through simple colonies such as *Scenedesmus, Desmodesmus* and *Pediastrum.* A similar lineage can be traced in the Volvocales from the single-celled *Chlamydomonas* through *Eudorina* (a colony of up to 128 cells) to *Volvox* (1,000–3,000 cells) (Crow 1918, McShea et al. 2003). Although Volvocales is regarded as the most primitive order in the Chlorophyta, *Volvox* is the most highly developed colonial algae, with separate sex cells. Until now in the evolution of the algae, any cell may be called upon to channel energy into reproduction. *Volvox* is the first step to the differentiation of tissue found in the higher plants. Indeed, one suggestive feature of the green algae is that the photosynthetic pigments of their chloroplast are present in the same proportions as they are in the higher plants. They are the best candidates for being, by way of the mosses and liverworts, the ancestors of all land plants.

Like higher plants, the green algae have chlorophylls a and b, and an alternation of generations (unlike the plants, however, the alternation may be isomorphic, that is, gametophyte and sporophyte are indistinguishable).

Members of the order Charales, or stoneworts, even look like 'higher' plants and might be mistaken for a horsetail. However, a hand lens shows that the 'stem' is an algal thallus, made up of giant, multinucleated cells up to 5 cm long. The thallus is branched, with a whorl of small branchlets at each node, and can grow up to 120 cm long. The cells of charophytes are often used for studies in cyclosis; the cytoplasmic streaming in the genus *Chara* is the fastest recorded of any cell — 40 $\mu m\ s^{-1}$ or more (Williamson 1975).

Stoneworts grow entirely under water, preferring ponds or lakes, although they are sometimes found in running water. In a newly dug pond, they are often the first plants to appear but soon lose out to more vigorous vegetation. There are about twenty-one species in the UK (Stewart and Church 1992). *Nitella mucronata,* a JNCC Nationally Scarce Species, occurs in the Viaduct Pond, Hampstead Heath. The name stonewort comes from the way in which they become encrusted by calcium carbonate; the American name of muskgrass comes from their musky, almost garlicky smell.

Another interesting order within the green algae is the Desmidiales, or desmids; their usual form is of two semi-cells joined by a narrow connection (the isthmus), which contains the nucleus. They show a great variety of body shapes, often ornamented, and there are a few filamentous forms.

They are usually associated with nutrient-poor, slightly acid water, but some species are found in the alkali and eutrophic waters of the Hampstead ponds, although rarely in any kind of numbers.

Even among the green algae, they are remarkable for their beauty, and we must hope that the forthcoming Ray Society volume on the group will advance their study.

## Euglenophyta (euglenids)

*Euglena* is well-known from biology 'O' level as an alga which shares some animal characteristics, such as the way it propels itself through the water using its long flagella. Euglenids are found in stagnant fresh water and, as well as *Euglena,* include *Phacus,* a more leaf-shaped version of *Euglena,* and *Trachelomonas,* where the cell is encased within a lorica, a rigid, spherical, shell-like envelope of minerals and mucilage.

## Chrysophyta (golden-brown algae)

The golden-brown algae are mainly unicellular or colonial, swimming or floating in lakes as phytoplankton, and are most abundant and diverse in fresh waters of neutral or slightly acidic pH with low conductivity, low nutrient levels and cold temperatures. In ponds that dry up in summer or freeze completely in winter, they survive by forming protective cysts. On Hampstead Heath, they are among the first algae of the year, often appearing as early as March. *Dinobyron,* a colonial form, is often present, though never in large numbers. The flagellate cells are housed in a cone-shaped, cellulose lorica, which can be detected in the plankton long after the colony has died.

The golden-brown colour, due to the carotenoid pigment fucoxanthin, is distinctive. The golden-brown algae are also unusual in having two unequal flagella in either the vegetative or reproductive stage. One is long, covered in two rows of tripartite hairs (only visible under the electron microscope), and is located on the cell anterior, while the other is short, smooth, and directed laterally or posteriorly, perpendicular to the longer flagellum. The anterior flagellum moves with a flat, S-shaped motion to propel unicellular organisms forward; the short flagellum describes a spiral and allows colonial forms to swim with a rotational motion. The flagella may be covered in scales.

A notable sub-section of the golden-brown algae are the synurophytes (Synurophyceae). These are motile flagellates covered by siliceous scales and with two parallel flagella that emerge from an anterior pore or from in between scales. Each cell has one or two golden-coloured chloroplasts. *Mallomonas* and *Synura* belong to this group and are often found in Hampstead Ponds. *Mallomonas caudaata* formed a bloom in the Leg of Mutton Pond in August 2007.

## Xanthophyta (yellow-green algae)

The yellow-green algae were once part of the Chrysophyta together with the golden-brown algae and the diatoms. Now called the xanthophytes (Xanthophyceae) or Tribophyceae, the group contains some interesting algae, from unicellular to colonial and filamentous forms. All members are distinguished by their lack of fucoxanthin, which accounts for their pale colour, and the presence of chlorophyll b. The typical yellow-green colour is due to the pigment diatoxanthin.

*Vaucheria* is common in fresh and brackish water, particularly on mud. It is siphonous, that is, it does not have cell walls; a filament can be up to a metre long and will be a single cell or coenocyte. The cytoplasm of *Vaucheria* is restricted to the cell periphery by large vacuoles and contains many nuclei and discoid plastids. These plastids can change their orientation in response to changes in light levels.

The lack of cell walls make it vulnerable to mechanical damage, but means that *Vaucheria* has overcome the hurdle of water transport that prevents most cellular algae growing away from aquatic habitats (Christensen 1987);

nutrients can easily diffuse from those parts of the filament buried under mud to the exposed and growing part. This has made *Vaucheria* a very successful colonizer of mud, on which it appears as an extensive green felt. *Vaucheria* can spread by simple fragmentation of the filaments, each fragment growing to be a new plant. It can reproduce asexually by releasing zoospores into the water, or sexually by producing male and female gametes from the antheridia and oogonium respectively.

Sexual reproduction is rare in the yellow-green algae and only occurs in one other genus, *Botrydium*. This is another colonizer of mud and is rather uncommon. It is worth noting the wholly aquatic and filamentous *Tribonema,* of which there are three species in Great Britain. The unbranched filaments are made up of a single row of elongated, cylindrical cells, with the cell wall made up of open-ended overlapping cylinders. A new one is created with each cell division so if the filament breaks into individual cells, they have H-shaped ends.

*Tribonema* is most abundant in the spring and autumn when temperatures are cooler, sometimes forming bright green mats that float on the surfaces of ditches, rivers, lakes, ponds and bogs. Several species of *Tribonema* are found in waters with pH values as high as 9.

### **Bacillariophyta (diatoms)** (Figure 2)

The diatoms are among the most important aquatic microorganisms; they are a major food resource for marine and freshwater organisms, they are a major source of atmospheric oxygen and they are responsible for at least a quarter of inorganic carbon fixed each year in the oceans, about ten billion tonnes (Granum et al. 2005). They are extremely abundant, in the fossil record as today, in the plankton and the sediments of marine and freshwater ecosystems. They are a significant part of the flora in soils.

Diatoms are distinguished by their silica shells, called frustules, made of two parts, the epitheca and hypotheca, which overlap like the two halves of a Petri dish. The shells are intricately ornamented and we owe the excellence of microscope lenses to those Victorians who drove their lens-makers to heroic efforts so that they could attempt to resolve these tiny patterns at, or beyond, the resolution limit of light. During cell division, the epitheca and hypotheca separate, and new valves are laid down between them. Because the frustule is of hard silica, the two offspring will be smaller than the ‘parent’ and the mean size of a dividing population of diatoms declines with time. However, diatoms can also reproduce sexually, producing offspring that form a new, full-sized, cell wall.

Their fossil record goes back to the Cretaceous, and some rocks, known as diatomite or diatomaceous earth, are formed almost entirely of fossil diatoms and are mined for abrasives, absorbents, filtering aids and the adsorbent in dynamite. A deposit of diatomaceous earth on the banks of the River Bann near Portglenone (County Antrim, Northern Ireland) was at one time cut like peat and used in making insulating bricks.

Freshwater diatoms are harmless, but the marine species of two genera, *Pseudonitzschia* and *Nitzschia,* can form large and toxic blooms, occurring in millions of cells per litre. The toxin produced is domoic acid, an amino acid neurotoxin that causes amnesic shellfish poisoning (Fritz et al. 1992, Bates et al. 1989). This is, however, only a handful of species out of at least 8,000 known species of diatoms.

### **Pyrrhophyta (dinoflagellates)**

The dinoflagellates also include a number of species that cause harmful blooms. The toxins include ciguatoxin, which causes ciguatera fish poisoning, okadaic acid, which causes diarrhetic shellfish poisoning, brevetoxins, which

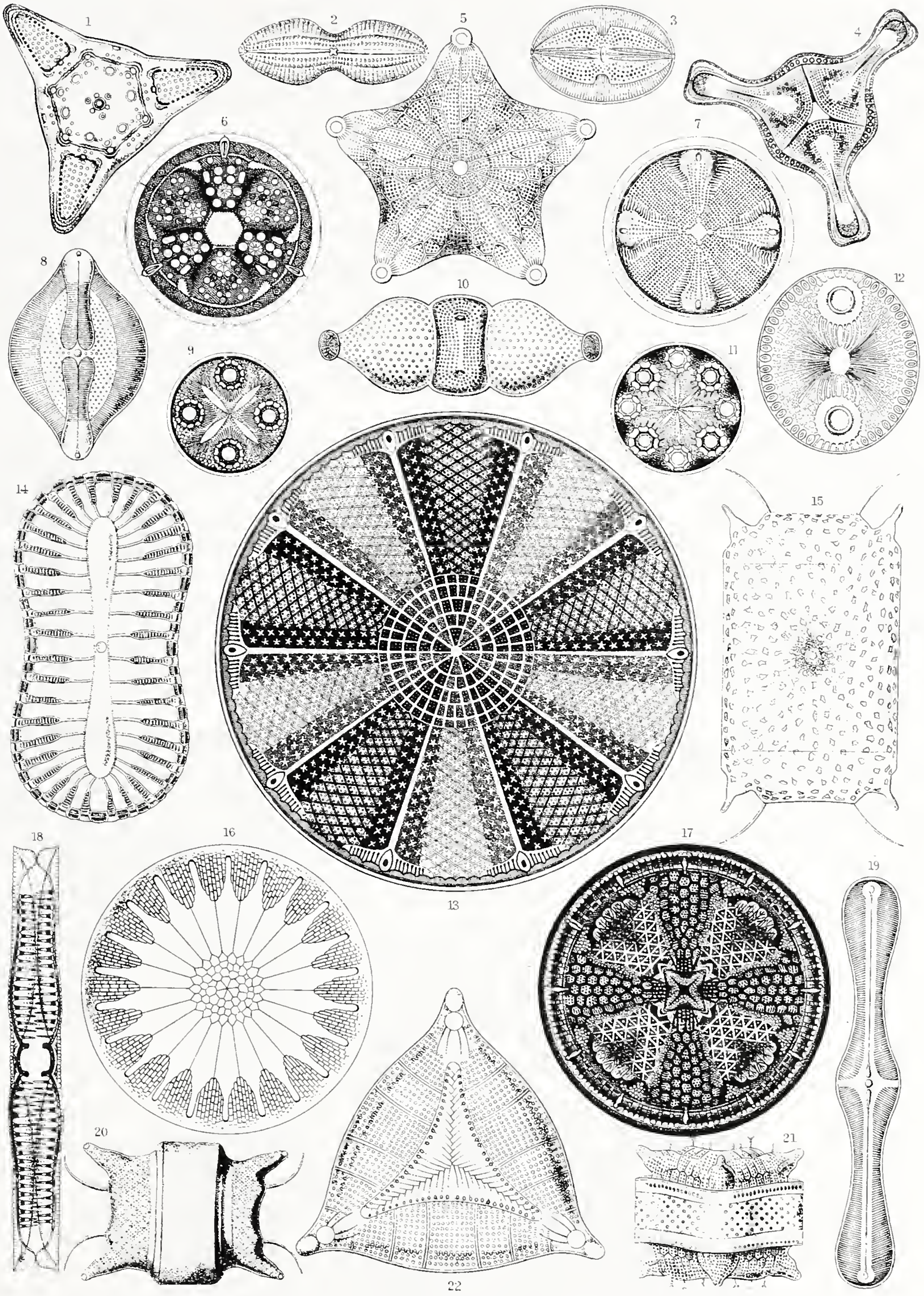

FIGURE 2. Diatoms, as illustrated on the fourth plate of Ernst Haeckel's *Kunstformen der Natur* (1904): 1. *Triceratium digitale* (Brun), 2. *Navicula lyra* (Ehrenberg), 3. *Navicula excavata* (Greville), 4. *Triceratium mirificum* (Brun), 5. *Triceratium pentacrinus* (Wallich), 6. *Actinoptychus constellatus* (Brun), 7. *Aulacodiscus mammosus* (Greville), 8. *Navicula wrightii* (Meara), 9. *Auliscus crucifer* (Brun), 10. *Biddulphia pulchella* (Gray), 11. *Auliscus craterifer* (Brun), 12. *Auliscus mirabilis* (Greville), 13. *Aulacodiscus grevilleanus* (Norman), 14. *Surirella macraeana* (Greville), 15. *Denticella regia* (Max Schultze), 16. *Asterolampra eximia* (Greville), 17. *Actinoptychus heliopelta* (Brun), 18. *Plagiogramma barbadense* (Brun), 19. *Pinnularia mulleri* (Haeckel), 20. *Biddulphia granulata* (Smith), 21. *Triceratium pentacrinus* (Wallich) and 22. *Triceratium moronense* (Greville). (Not to scale.)

causes neurotoxic shellfish poisoning, saxitoxin, which causes paralytic shellfish poisoning, and toxins produced by *Pfiesteria piscicida,* which cause possible estuary-associated syndrome. These are all problem species in brackish or salt water. Although freshwater species cause blooms, the result is normally nothing worse than a 'wet dog' sort of smell.

Dinoflagellates are unicellular and from spherical to needle-shaped, with the cell wall either bearing elaborately ornamented plates (often with horn-shaped projections) or, if without plates, then still with a clearly defined shape. Nearly all of them have two flagella, one which lies in a groove fore and aft, and another which lies in a transverse groove. The first deploys behind the organism, propelling it through the water. The latter gives a rotating movement.

*Ceratium hirundinella* is a common species on Hampstead Heath and formed a bloom on Wood Pond, Kenwood in August 1996.

## **Rhodophyta (red algae)** (Figure 3)

Red algae get their colour from the pigment phycoerythrin; this reflects red light and absorbs the blue. Because blue light has a short wavelength and hence greater energy, it penetrates water to a greater depth than light of longer wavelengths. Red algae therefore have the advantage in deep water, and most are marine. It is worth noting that red algae in the shallows — particularly of the Mediterranean — will often appear green; there is no need to produce great amounts of phycoerythrin when chlorophyll will work (Cole and Sheath 1990). Red algae also contain the blue pigment phycocyanin, which helps to produce a great amount of colour variation within this group.

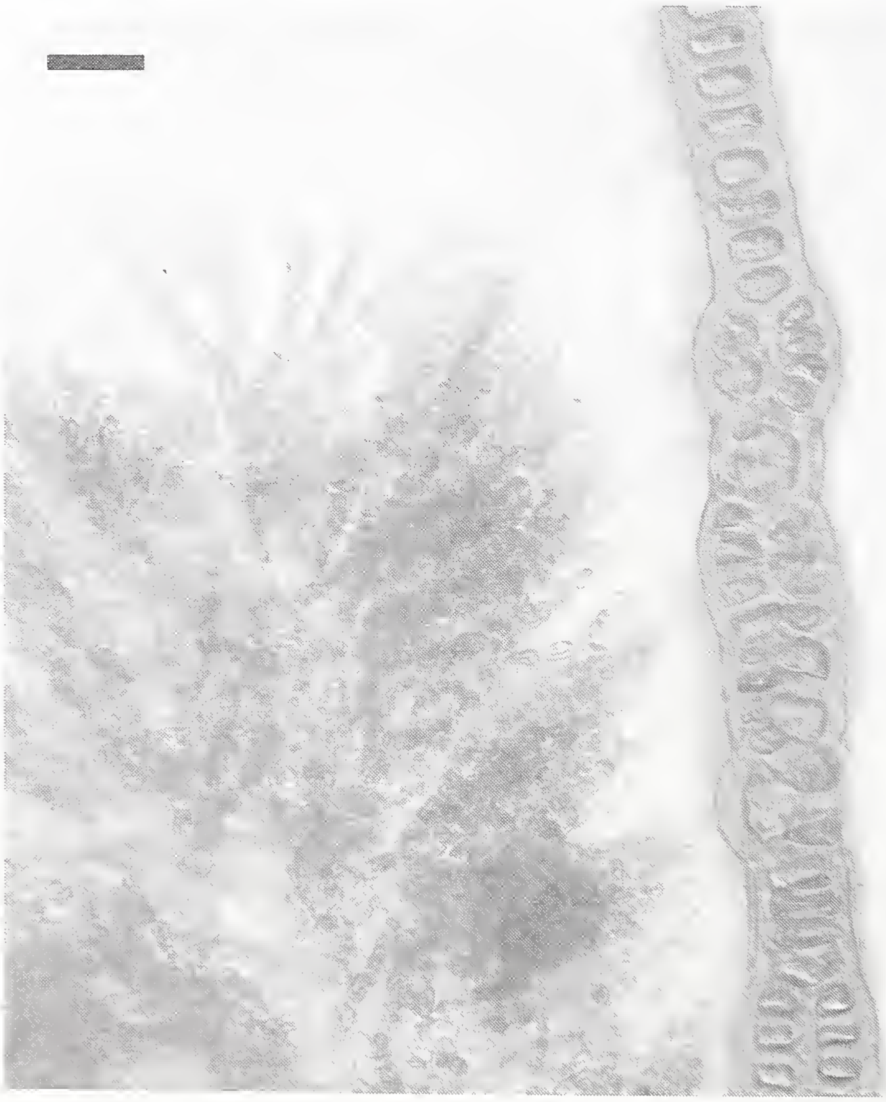

FIGURE 3. Red algae: *Batrachospermum gelatinosum* (left) and *Bangia atropurpurea* (right). Scale bar = 50 $\mu$m.

The few freshwater representatives are often green or olive brown, such as *Batrachospermum,* the 'frog-spawn algae' — but the rock-encrusting *Hildenbranchia* is a deep blood red. There are filamentous forms, such as *Audouinella* and *Bangia,* and *Thorea,* which is found in our area (John et al. 1989).

### Phaeophyta (brown algae)

If the red algae are rarely found in fresh water, the brown algae are hardly present at all. Britain has only three freshwater species of brown algae: Heribaudiella fluviatilis, which forms a thin (35 µm) crust about 1–5 cm wide on hard stones, such as flint, in fast-flowing water; *Pleurocladia lacustris,* which occurs in calcareous benthic habitats; and the final species, *Porterinema fluviatile,* which is found in our recording area — the single UK record is from a gravel pit in the Lee Valley (Belcher 1959).

### Minor orders

The **Prasinophyta** is a group of small (rarely more than 6 µm long), pale green unicellular flagellates. They have between one and eight lateral flagella, mostly covered with organic scales (Domozych et al. 1991). There are fourteen freshwater species recorded from the UK, but there are likely to be many more waiting to be discovered in this neglected group. Prasinophytes are much more common in the seas and oceans, but are not abundant. They are believed to be the first algae to have made the transition from salt to fresh water (Seckbach 2007) and to be the marine ancestor of all plants.

The **Glaucophyta** is a very strange group that has intracellular blue-green cyanelles instead of chloroplasts. Whitton (2002) describes this phylum as 'entirely artificial'. There are two species in two genera found in the British Isles; one, *Cyanophora paradoxa* in our recording area, in St James's Park.

The **Eustigmatophyta** are few in number and a relatively new group of organisms (Hibberd and Leedale 1970). *Nannochloropsis* is a member of the marine picoplankton, but most tend to be coccoid algae in soil or fresh water.

The **Raphidophyta** is a group of unicellular algae found in fresh and sea water. They have large cells (~50–100 µm), but no cell walls, and a pair of flagella: one pointing forwards, while the other, covered in lateral 'hairs' (mastigonemes), points backwards across the cell surface and lies within a ventral groove. Freshwater species normally occur in acidic waters, such as bog pools. Marine species often produce large blooms in summer, particularly in coastal waters. These are generally a nuisance, rather than a toxic hazard.

## Reproduction

### 1. Asexual reproduction

Most algae rely on asexual reproduction, which provides a means of increasing the number of individuals while restricting the genetic variability, and the commonest method is simple fission to produce a pair of identical cells. In a small number of colonial algae, miniature replicas of the colony, called daughter colonies, are produced. This is the case in *Volvox.*

Another method of reproduction involves the production of spores. There are two types; the motile zoospores and the non-motile aplanospores. The zoospores are produced by the division of a single cell and then break through the cell's wall to swim away and settle to produce new individuals. Aplanospores are non-motile spores produced in the same way.

### 2. Sexual reproduction

Although most algae reproduce asexually, the algae have evolved several variations in sexual reproduction with different types of gametes and different means of gamete delivery.

Isogamy is where the gametes are identical in shape, size and motility; there is no 'male' or 'female' (if the gametes are almost equal-sized, it is referred to as anisogamy). Fusion results in a zygote, which germinates into new individuals or zoospores. Heterogamy (sometimes oogamy) is where two different types of gametes are produced. The male gamete is very small, highly motile and is produced in very large numbers. The female gamete is much larger, non-motile and far less numerous.

Finally, there is conjugation. This is where neither gamete is motile and so two individuals must come together. Adjacent cell walls swell out and fuse, and the gametes combine to form a zygospore which then germinates to produce daughter cells.

Algae often show an alternation of generations; that is, there is more than one free-living stage of the organism. Mostly this consists of two recognizable phases — multicellular diploid phase (the sporophyte) alternates with a multicellular haploid phase (the gametophyte). Red algae have more complicated life cycles, often with a triphasic alternation of generations. Male and female individuals produce gametes which, when fertilized, grow into a carposporophyte, a spore which is eventually released to germinate and grow into a tetrasporophyte. Sometimes the tetrasporophyte looks like the male and female gametophytes that originally produced it (isomorphic alternation of generations), but they can look completely different (heteromorphic alternation of generations), forming a thin felt-like crust on the substrate. These different stages have sometimes been described as separate species.

## Numbers

The UK Biodiversity Action Plan (Biodiversity 1994) estimated there to be over 20,000 algal species in the UK, but this figure is disputed and may be an exaggeration (John et al. 2002). The latest checklist of freshwater algae (Whitton et al. 2003) has nearly 6,000 entries. Although no doubt there are algae waiting to be discovered, there are unlikely to be 14,000. But we should remember that *Prochlorococcus,* a genus of very small (0.6 $\mu$m) marine blue-green algae, was not discovered until 1986, yet it is now thought to be the most abundant photosynthetic organism on Earth (Chisholm et al. 1988). A whole new group of algae, the tiny orange eukaryote Picobiliphyta, was found among the plankton of northern seas as recently as 2007 (Not et al. 2007). A recent report (Brodie et al. 2007) states 'About 34,000 species are recognised today although it has been estimated that there could be in excess of 350,000 algal species worldwide.'

## Conclusion

This has been a brief and superficial look at the world of the algae. Many of the groups merit, and some have received, monographs the size of telephone directories. Here, they have been fobbed off with fewer words than would fill a cigarette-card. But I do hope I have managed to convey something of my enthusiasm for these fascinating organisms. If just one of you pauses before raking blanket weed out of your pond, and takes a filament of it to the microscope, I will have done well. Because I know that then I will have a convert.

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## References

BATES, S. S., BIRD, C. J., de FREITAS, A. S. W., FOXALL, R., GILGAN, M., HANIC, L. A., JOHNSON, G. R., McCULLOCH, A. W., ODENSE, P., POCKLINGTON, R., QUILLIAM, M. A., SIM, P., G. SMITH, J. C., SUBBA RAO, D. V., TODD, E. C. D., WALTER, J. A. and WRIGHT, J. L. C. 1989. Pennate diatom *Nitzschia pungens* as the primary source of domoic acid, a toxin in shellfish from eastern Prince Edward Island, Canada. *Can. J. Fish. Aquatic Sci.* **46**: 1203–1215.

BELCHER, J. H. 1959. Some uncommon Chlorophyceae from the Lee Valley. *Br. Phycol. Bull.* **1** (7): 73–74.

BENEMANN, J. R. 2004. Hydrogen and methane production by microalgae. In: *Handbook of microalgal culture: biotechnology and applied phycology.* Ed. A. Richmond. Blackwell Publishing, Oxford.

BERMAN-FRANK, I., LUNDGREN, P., CHEN, YI-BU., HENDRIK, K., ZBIGNIEW, K., BERGMAN, B. and FALKOWSKI, P. 2001. Segregation of Nitrogen Fixation and Oxygenic Photosynthesis in the Marine Cyanobacterium *Trichodesmium.* Science **294** (5546):1534–1537.

BIODIVERSITY. 1994. *The UK Biodiversity action plan.* Cm 2428, HMSO, London.

BRODIE, J., JOHN, D. M., TITTLEY, I., HOLMES, M. J. and WILLIAMSON, D. B. 2007. *Important plant areas for algae: a provisional review of sites and areas of importance for algae in the United Kingdom.* Plantlife International, Salisbury.

BRODIE, J. and LEWIS, J. (eds) 2007. *Unravelling the algae: the past, present, and future of algae systematics.* Systematics Association Special Volumes, Series 75, CRC Press, London.

CAVALIER-SMITH, T. 1993. Kingdom protozoa and its 18 phyla. *Microbiol. Rev.* **57** (4): 953–994.

CHISHOLM, S. W., OLSON, R. J., ZETTLER, E. R., WATERBURY, J., GOERICKE, R. and WELSCHMEYER, N. 1988. A novel free-living prochlorophyte occurs at high cell concentrations in the oceanic euphotic zone. *Nature* **334**: 340–343.

CHRISTENSEN, T. 1987. *Seaweeds of the British Isles, Volume 4: Tribophyceae (Xanthophyceae).* Natural History Museum, London.

COLE, K. M. and SHEATH, R. G. (eds) 1990. *Biology of the red algae.* Cambridge University Press, Cambridge.

CROW, W. B. 1918. The classification of some colonial chlamydomonads. *New Phytol.* **17** (7): 151–159.

DOMOZYCH, D. S., WELLS, B., and SHAW, P. J. 1991. Basket scales of the green alga, *Mesostigma viride*: chemistry and ultrastructure. *J. Cell Sci.* **100**: 397–407.

FARQUHAR, J., BAO, H. and THIEMENS, M. 2000. Atmospheric influence of Earth's earliest sulfur cycle. *Science* **289** (5480): 756–758.

FOGG, G. E., STEWART, W. D. P., FAY, P. and WALSBY, A. C. 1973. *The blue-green Algae.* Academic Press, London.

FRITZ, L., QUILLIAM, M. A., WRIGHT, J. L. C., BEALE, A. M. and WORK, T. M. 1992. An outbreak of domoic acid poisoning attributed to the pennate diatom *Pseudonitzschia australis. J. Phycol.*, **28**: 439–442.

GRANUM, E., RAVEN, J. A. and LEEGOOD, R. C. 2005. How do marine diatoms fix 10 billion tonnes of inorganic carbon per year? *Can. J. Bot.* **83**(7): 898–908.

HAAG, A. L. 2007. Algae bloom again. *Nature* **447**: 520–521.

HAECKEL, E. 1904. *The Wonders of Life.* Trans. Joseph McCabe, 1905. Harper & Brothers, New York.

HIBBERD, D. J. and LEEDALE, G. F. 1970. Eustigmatophyceae — a new algal class with unique organization of the motile cell. *Nature* **225**: 758–760.

HILLEN, L. W., POLLARD, G., WAKE, L. V. and WHITE, N. 1982. Hydrocracking of the oils of *Botryococcus braunii* to transport fuels. *Biotech. Bioeng.* **24** (1): 193–205.

JOHN, D. M., JOHNSON, L.R. and MOORE, J. A. 1989.The red alga *Thorea ramosissima*: its distribution and status in the Thames catchment. *Lond. Nat.* **68**: 49–53.

JOHN, D. M., WHITTON, B. A. and BROOK, A. J. 2002. *The freshwater algae flora of the British Isles.* Cambridge University Press, Cambridge.

KASTING, J. F. and SIEFERT, J. L. 2002. Life and the evolution of Earth's atmosphere. *Science* **296** (5570): 1066–1068.

McSHEA, D. W. and CHANGIZI, M. A. 2003. Three puzzles in hierarchical evolution. *Integrative and Comparative Biol.* **43**: 74–81.

METZGER, P. and LARGEAU, C. 2005. *Botryococcus braunii*: a rich source for hydrocarbons and related ether lipids. *Appl. Microbiol. Biotech.* **6** (25): 486–496.

MULKIDJANIAN, A. Y., KOONIN, E. V., MAKAROVA, K. S., MEKHEDOV, S. L., SOROKIN, A., WOLF, Y. I., DUFRESNE, A., PARTENSKY, F., BURD, H., KAZNADZEY, D., HASELKORN, R. and GALPERIN, M. Y. 2006. The cyanobacterial genome core and the origin of photosynthesis. *Proc. natn. Acad. Sci. USA* **103** (35): 13126–13131.

NOT, F., VALENTIN, K., ROMARI, K., LOVEJOY, C., MASSANA, R., TÖBE, K., VAULOT, D. and MEDLIN, L. K. 2007. Picobiliphytes: A marine picoplanktonic algal group with unknown affinities to other eukaryotes. *Science* **315** (5809): 253–255.

SAPP, J. 2005. The prokaryote-eukaryote dichotomy: meanings and mythology. *Microbiol. Molec. Biol. Revs* **69** (2): 292–305.

SECKBACH, J. 2007. *Algae and Cyanobacteria in extreme environments.* Kluwer Academic Publishers, Dordrecht.

SHEEHAN, J., DUNAHAY, T., BENEMANN, J. and ROESSLER, P. 1988. *A look back at the U.S. Department of Energy's Aquatic Species Program: Biodiesel Production from Algae.* National Renewable Energy Laboratory NREL/TP-580-24190.

STANIER R. Y. 1974. Reviewed work(s): *The blue-green Algae.* by G. E. Fogg; W. D. P. Stewart; P. Fay; A. E. Walsby. *Limnol. Oceanogr.* **19** (3): 550–552.

STEWART, N. F. and CHURCH, J. M. 1992. *Red Data Books of Britain and Ireland.* The Joint Nature Conservation Committee, Peterborough.

STÖCKEL, J., WELSH, E. A., LIBERTON, M., KUNNVAKKAM, R., AURORA, R. and PAKRASI, H. B. 2008. Global transcriptomic analysis of Cyanothece 51142 reveals robust diurnal oscillation of central metabolic processes. *Proc. natn. Acad. Sci. USA.* **105**: 6156–6161.

TYRRELL, T. 1999. The relative influences of nitrogen and phosphorus on oceanic primary production. *Nature* **400**: 525–531.

WHITTAKER, R. H. 1969. New concepts of kingdoms of organisms. *Science* **163**: 150–160.

WHITTON, B. A. 2002. Glaucophyta. *In* John, D. M., Whitton, B. A. and Brook, A. J. *The freshwater algae flora of the British Isles.* Cambridge University Press, Cambridge.

WHITTON, B. A., JOHN D. M., KELLY M. G., HAWORTH, E. Y. 2003. *A coded list of freshwater algae of the British Isles.* Ed. 2. World-wide web electronic publication.

WILLIAMSON, R. E. 1975. Cytoplasmic streaming in Chara: a cell model activated by ATP and inhibited by cytochalasin B. *J. Cell Sci.* **17** (3): 655–668.

WOESE, C. R., BALCH, W. E., MAGRUM, L. J., FOX, G. E. and WOLFE, R. S. 1977. An ancient divergence among the bacteria. *J. molec. Evol.* **9**: 305–311.

WOESE, C. R., KANDLER, O. and WHEELIS, M. L. 1990. Towards a natural system of organisms: proposal for the domains Archaea, Bacteria, and Eucarya. *Proc. natn. Acad. Sci. USA* **87** (12): 4576–4579.

# The trees and woodland of Abney Park Cemetery

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## Abstract

This paper details observations from a ten-year study of the planted and naturally regenerating woody species of Abney Park Cemetery Nature Reserve. All 175 species on site are listed as are additional cultivars. A detailed discussion is made of the surviving remnants of the Victorian arboretum and some of the seventy naturally regenerating woody species that make up the 32-acre (13-hectare) woodland. Historically significant as a pioneering, public arboretum of world-class planting, Abney is now a complex, urban woodland that offers refuge to many hundreds of species and possible insight into climate adaptation.

## Introduction

Abney Park Cemetery in Stoke Newington, north London is a Local Nature Reserve and Site of Metropolitan Importance for Nature Conservation (SINC). The cemetery was created in1840 following the vision of John Claudius Loudon to combine the interment of the ever-growing urban population, with public open space and, most imaginative of all, an arboretum of exotic trees from all over the world. This was long before the creation of the great Victorian parks of London (neighbouring Clissold Park did not open until 1889). Benefiting from its proximity to Hackney's ground-breaking nurseries, in particular that of George Loddiges, Abney was planted with an amazing variety of trees and shrubs. Two and a half thousand different woody species were planted (plus a thousand varieties of rose) and at the time Abney was a nationally important collection greater than the Royal Botanical Gardens at Kew (Solman 1995: 61).

Many of the original trees were lost in 1890 to make way for burials and replanting. The twentieth century was a period of continuous decline for the cemetery business. With less and less space for new burials income fell and the site ceased to be maintained as a manicured garden cemetery. Once the mowing and clipping stopped natural succession of trees and shrubs began. In 1979 the site was bought by the London Borough of Hackney for £1. It now comprises thirty-two acres (thirteen hectares) of secondary woodland which largely self seeded during the Second World War and post war era. Although most of the canopy was cleared during the early 1980s, designation as a nature reserve and the huge labour required to restrict woodland regeneration means that much of what was cut down has now returned as coppice. Few of the original arboretum species survive (the old arboretum) but of those that do most are magnificent trees, some of considerable rarity. The woodland is remarkably diverse thanks largely to the site's history as an arboretum but also to sensitive planting in the last fifteen years.

Today there are 49 native species and another 126 exotic species on site (trees, shrubs and climbers — see Tables 1 and 2). Significantly, 70 species are regenerating naturally either by seed, sucker or layering. Although long since eclipsed as a world-leading arboretum, Abney is now a very rich and complex woodland. Furthermore, as a naturalized, semi-exotic woodland within the microclimate of London, Abney's woodland represents an unplanned, living experiment in climate adaptation. Many of the species that have done well are of European provenance of a significantly more southerly latitude than London. The woodland is also alive with a multitude of animal, fungal and plant species that would have had no home when the site was under more intensive management. This paper details the trees of Abney and touches on some of the other species supported by its diverse habitats.

## The old arboretum

In the late nineteenth century many of the original trees were replaced with more fashionable but sadly less durable species. The horse chestnuts *Aesculus hippocastanum,* Italian black poplars *Populus* × *canadensis* 'Serotina' and Plantier's poplars *P. nigra* 'Plantierensis' planted in 1890 still dominate many areas of the site, but in most winters several are lost to a combination of decay and high winds.[1] Only around two dozen of the original 1840 specimens survive. These impressive curiosities hidden within the new woodland are all that remain of Loddiges' great planting scheme. Most are remarkable in both their size and rarity.

### The old oaks

Thanks to their longevity and the anti-fungal properties of oak heartwood, the greatest number of survivors are predictably in the genus *Quercus*. Eight old oaks are tucked away in the north-west of the site which is now dominated by leggy ash coppice. One is a healthy English oak *Quercus robur*. It lost a huge limb in the storm of October 1987 and although the wound is still gaping the tree is comfortably creeping through middle-aged maturity. In the summer it plays host to purple hairstreak *Neozephyrus quercus* butterflies. The females lay eggs on new buds high in its canopy and both adults feed on honeydew-coated leaves, hopping between the oak and neighbouring ash. A maiden's blush moth *Cyclophora punctaria* was discovered in August 2008. This is the first record of this species in Hackney. An oak woodland specialist, this moth is rarely recorded anywhere in north or east London because of the paucity of wooded areas around old oaks (Plant 1993: 28).

A fine Turner's oak *Q.* × *turneri* 'Pseudoturneri', a hybrid between English oak and holm oak *Q. ilex,* stands at the northern edge of the site. Apparently pollarded when the Council gained control of the site in 1979, this is the more common 'false' Turner's oak, i.e. not a true clone from the original Spencer Turner tree *Q.* × *turneri* 'Spencer Turner'. It is in great health and, in its minor differences to the original, illustrates the tendency of hybrids to exhibit variation (Wiltshire and Coombes 2001: 21–27).

### Rare Lucombe and Fulham oaks

The other six oaks form a small grove of baffling rarity (Figure 1). Some of these exotics have kept the pages of *The London Naturalist* busy over the years as Elinor Wiltshire has battled to reveal their secrets. Her detective work on Lucombe and Fulham oaks resulted in her discovering at Abney a very rare

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[1] Plantier's poplar, a common back cross of Lombardy poplar with wild black poplar, supports the spiral galls of the social aphid *Pemphigus spirothecae*. The galls are deformations of the leaf petiole and only occur on *Populus nigra* species and cultivars. The aphids develop inside the galls but in Abney they form part of the diet of an increasing population of grey squirrels.

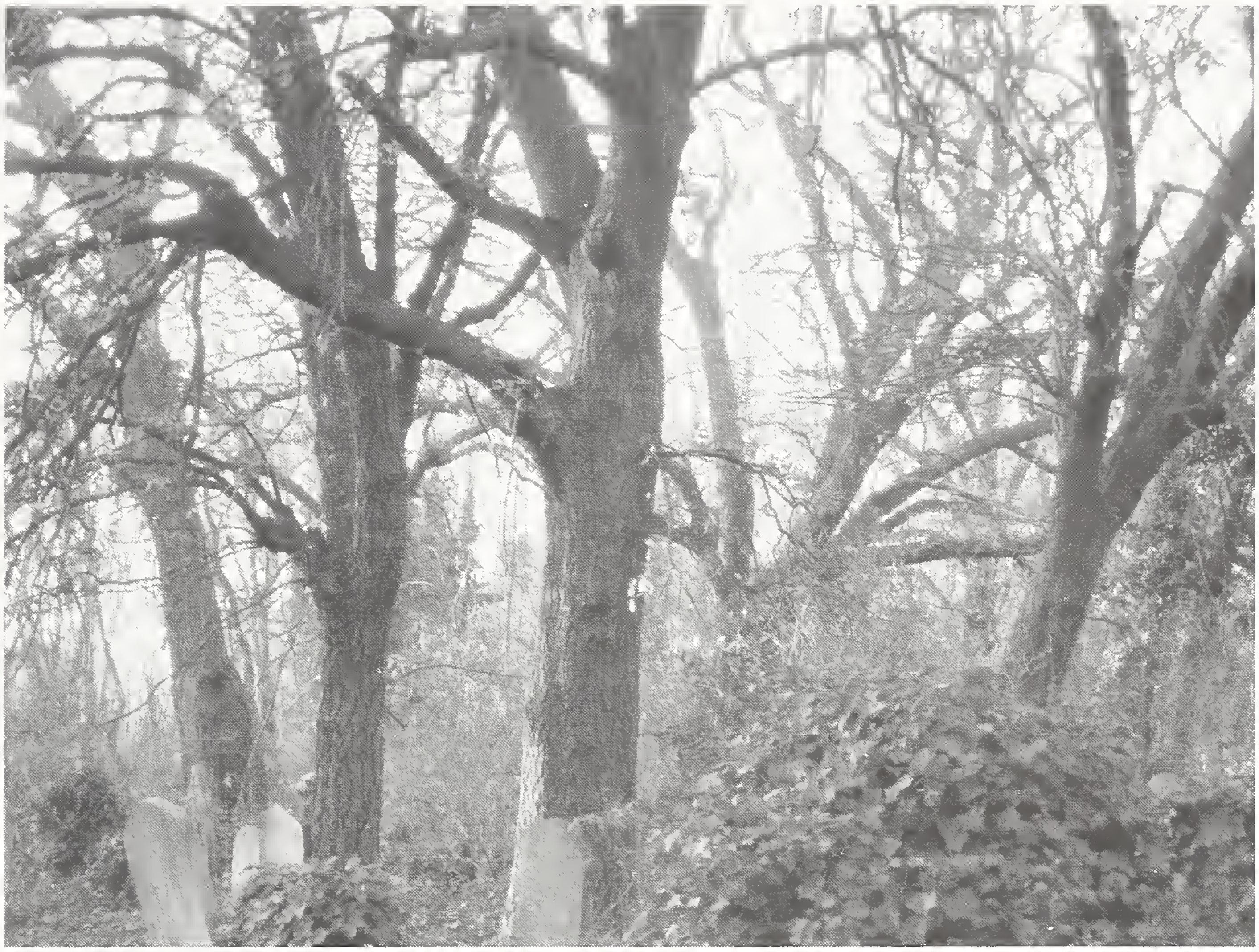

FIGURE 1. Abney Lucombe oak grove. From left to right: Ragnal oak *Quercus* × *hispanica* 'Ragnal' (rear); Variable-leaved Lucombe oak *Q.* × *hispanica* 'Heterophylla'; Fulham oak *Q.* × *hispanica* 'Fulhamensis' (front); Broad-leaved Lucombe oak *Q.* × *hispanica* 'Latifolia' (rear); Weeping Lucombe oak *Q.* × *hispanica* 'Pendula'.

*Photo: R. Miller*

variable-leafed Lucombe oak *Quercus* × *hispanica* 'Heterophylla'. Possibly the only one of its kind in the country, it has recently been propagated by graft (Wiltshire 2004*a*).[2]

Abney's old oaks present great problems to anyone with the temerity to try and put names to them. They are hybrids of cork oak *Q. suber* and Turkey oak *Q. cerris* that are notoriously difficult to classify. As outlined by Wiltshire (2004*a*), the history of the Lucombe oak is fairly well documented. However, all that most commentators appear to agree upon is the great diversity that characterizes the numerous cultivars and the inadequacy of all previous attempts at naming them. The nomenclature is confused and even the accepted hybrid specific name, *Quercus* × *hispanica,* is problematic since the tree does not occur naturally in Spain. The species name has been subject to frequent alterations. Previous epithets include *Q. cerris* 'Lucombeana', *Q. cerris dentata, Q.* × *pseudosuber* and *Q.* × *crenata*. The latter is preferred by some authors e.g. Wiltshire (2004*a*). Further, Abney's trees are of such prestigious origin they may be extremely rare forms, as illustrated by the discovery of the 'Heterophylla'.

Wiltshire (in litt.) has suggested one of the other six Abney trees maybe *Quercus cerris* 'Cana Major', *Q. c.* 'Cana Minor', or *Q. c.* 'Ragnal'. 'Cana Major' is listed as a fully deciduous Lucombe oak cultivar in the *Tree Guide* (Johnson and Moore 2004). All three cultivars were listed by Loudon as deciduous Turkey oaks, but Loudon also referred to Lucombe and Fulham oaks as *Q. cerris* varieties and it seems probable these were in fact Lucombe oak back crosses with Turkey oak. They were introduced by Loddiges around 1836 so at least one of each would have been planted at Abney (the Abney planting replicated everything in the Loddiges nursery — Solman 1995: 61)[3]. In a publication contemporaneous with the original planting, George Collison, a major force behind the creation of Abney Park Cemetery, purports to have listed every species and variety at Abney. He specifically refers to '*Quercus cerris Ragnal'* (Collison 1840: 368). Loddiges listed this tree as simply *Quercus Ragnal* in their 1836 catalogue. It seems therefore that one of the remaining trees is a rare Ragnal oak, though its modern name would be *Q.* × *hispanica* 'Ragnal'. The distinguishing feature of all three forms are narrow, deciduous, downy leaves (Loudon 1838: 1849–1850).

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[2] Cuttings were taken in 2005 and grafted progeny are now being grown at several sites including Kew Gardens.

Another of the difficult six is undoubtedly a rare Fulham oak *Quercus* × *hispanica* 'Fulhamensis', another *Q. cerris* × *Q. suber* hybrid of possibly separate origin (Frontispiece). It is almost evergreen and of weeping habit, characteristics recommended for cemetery planting by Loudon. In a book on cemeteries published just before his death, Loudon (1843: 98) refers to a specifically weeping type of Fulham oak using his preferred name *Q. cerris fulhamensis pendula*. However, Collison (1840) lists only one Fulham oak under the name *Q. cerris dentata*. This tree has been DNA matched as a true Fulham oak, i.e. propagated vegetively from the original tree at the Fulham Nursery (Rumsey et al. 2006: 46).

## The unnamed Lucombe oaks

Although known chiefly from their cultivated forms, Lucombe oaks occur naturally from southern France to Italy, where the ranges of the parent species overlap. The hybrids are very variable if not propagated vegetively. Consequently there are a large number of more or less distinct forms. Unlike many hybrids, Lucombe oaks are often fertile thereby giving rise to both their own self-fertilized offspring ($F_2$, $F_3$, etc. hybrids) and back crosses with either parent (where such is present in close proximity).

As if this were not enough there is the added dimension at Abney that many of the original trees were formatively pruned to create interesting shapes, in particular broad crowns. This has had dramatic consequences for the English oak and Ragnal oak. Both appear to have been pollarded when young at a height of about one metre. This resulted in both developing massive open crowns, each supported by two giant limbs forming a broad V shape. Unfortunately such massive forks are vulnerable to failure due to the huge weight and stress carried at the join. In the storm of October 1987 both trees split in half. Although less apparent, it is possible that the largest of the unidentified Lucombe oaks was also pruned at five metres to create a very open crown (Figure 2). If the shape was intentional then the arboriculturist responsible was a very capable and far-sighted individual. The tree is the pick of Abney's magnificent old oaks. However, it and two other trees have so far defied positive identification.

One is labelled 'Lucombe oak' and it has been suggested this is the fairly common cultivar 'Crispa'. However, its foliage is deciduous and the bark hard, unlike *Q.* × *hispanica* 'Crispa' which is semi-evergreen and has corky bark (Loudon 1838: 1855–1856). It is a remarkably upright tree not unlike the true Lucombe oak, i.e. the clone originating from William Lucombe's nursery in 1762 (*Q.* × *hispanica* 'William Lucombe'). However, the Abney tree is much slower growing than the 'William Lucombe'. As a first generation hybrid the original tree exhibited heterosis, vigorous growth often associated with hybrids.

The Abney oak grove appears to have been planted with similar trees grouped together, as one would expect in an arboretum. So three of the six oaks, including the *Fulhamensis* and *Heterophylla*, are all corky barked, sub-evergreen, pendulous trees. The other three, including the *Ragnal* and putative *Crispa*, are deciduous, more upright and not corky barked. Frustratingly,

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[3] Johnson records 'Cana Major' as introduced in 1849 but given the earlier reference by Loudon this appears to be incorrect.

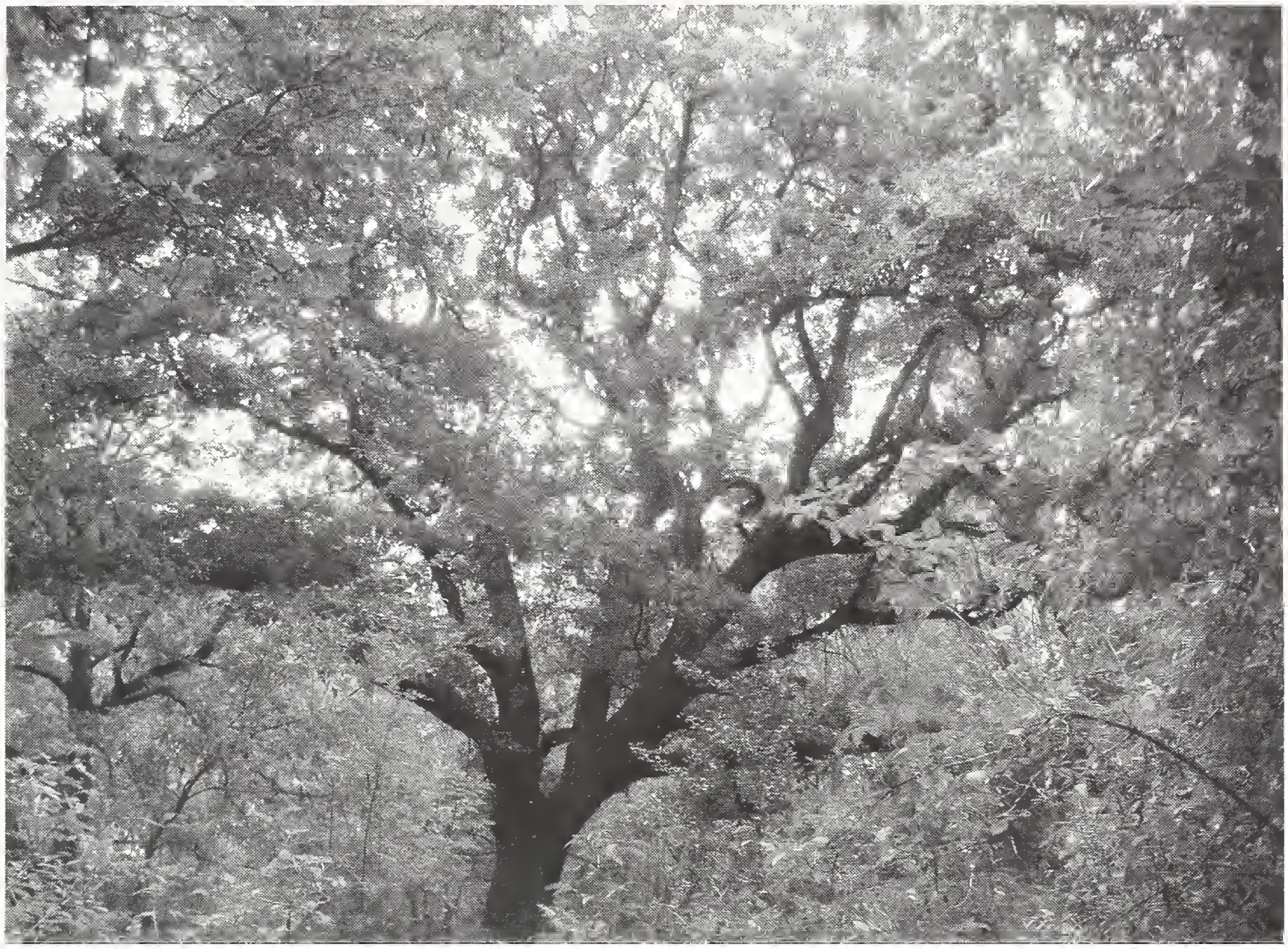

FIGURE 2. Broad-leaved Lucombe oak *Quercus* × *hispanica* 'Latifolia'. This oak is pictured in Ramsey, Russell and Wiltshire (2006: 41) — titled Fulham oak. It is not the tree linked by DNA testing to the original Fulham tree. The latter is the tree in the Frontispiece. *Photo: R. Miller*

Collison does not solve the mystery but he does at least offer an explanation for the problem. The final entry in his list of oaks planted at Abney reads '*Lucombeana canus* varieties 1 to 21 inclusive'. As with most texts of this age the nomenclature requires a little decoding since there is no such thing as a *Lucombeana canus* in the modern literature. However, *canus* is Latin for whitish-grey and the new crop of Lucombe oaks released by Pince & Sons of Exeter (described by Loudon 1838 as *crispa, suberosa, dentata, incisa* and *heterophylla*) had grey, corky bark. They were presumably back crosses with *Q. suber* (Mitchell 1994: 220).

So it would appear the prolific Loddiges planted not just the five new Pince cultivars but also another sixteen Lucombe oak forms. This explains not only why it is so hard to name the remaining three Abney trees but also why there is so much confusion in the literature about the 'new' Lucombe oak. If Pince & Sons, Loddiges and or others, produced over twenty new forms of Lucombe oak in the early nineteenth century, there is little wonder a century and a half later authors as authoritative as Alan Mitchell have struggled to match the numerous survivors found all over the country to the eight names offered by Loudon (i.e. Pince's five plus the Loddiges' three above). So in the albeit partial resolution of the Abney identification quiz we have a clue as to the wider problem of classification of the Lucombe oak.

In the absence of a copy of Loddiges' 1836 catalogue one either: accepts some trees have no name, crowbars them into one of the names offered by Loudon, or finally gives names to the orphaned trees. The last seems the only proper approach since they do not fit the descriptions in Loudon. The putative C*rispa* could be called *Q.* × *hispanica 'Minor'*, in recognition of its similarity to the original clone but with much slower growth. The other corky barked tree could be another *Fulhamensis*. It was hit when the *Ragnal* split in half and is therefore slightly harder to identify (both crown and bark were damaged). It closely resembles its rare neighbour, albeit with perhaps slightly less regular leaves. If it cannot be confirmed as a Fulham oak it could be named *Q.* × *hispanica 'Pendula'*, reflecting its pendulous habit. It does not appear to be Loudon's weeping Fulham oak since, although that is not described by Loudon, this tree is no more weeping than the true Fulham oak that stands next to it.

The largest tree is significantly bigger than the others but almost certainly dates to the same 1840 planting. The discrepancy in size is probably due to a combination of heterosis and the fact its huge crown captures more light than any of the other trees. Heterosis is generally confined to original ($F_1$) hybrids, rather than their offspring. It is impossible to know which of the twenty-one varieties planted were back crosses, 'selfs' or true second-generation hybrids, although the reference to 'canus' perhaps suggests *Q. suber* back crosses. With so many sub-varieties planted it would be unsurprising if one exhibited rapid growth. The big tree leans slightly to the north-east, having shifted its root plate, probably during the October 1987 storm. Recent DNA testing was inconclusive (Rumsey et al. 2006: 47). In winter a few leaves cling on around the base of the crown but it is basically deciduous. The leaves are significantly broader than other Lucombe oaks. There is a record of a broad-leaved Fulham oak (*Q. cerris fulhamensis latifolia*) propagated from the original Fulham tree by Messrs Osborne (Loudon 1838: 1847; described in McArdle and Santamour 1987: 253.) It does not appear in the Collison (1840) list and one might expect it to be sub-evergreen like its forbear. In any event the Loudon name is unacceptable in modern taxonomy. Cultivars cannot have sub-varieties, each must have its own name. *Q.* × *hispanica* 'Latifolia' would seem appropriate.

## The old thorns

Amongst Loddiges' other specialities were hawthorns, and Collison (1840) lists over seventy species of these much underrated trees as having been planted in the original arboretum.[4] There remain at least four old trees that certainly date back to 1840, and probably two more. Most are over-mature or veteran common hawthorns *Crataegus monogyna*, also known as may. Each is a wildlife goldmine in its own right. One old may tree sports an unusual bracket fungus *Phylloporia ribis*, a sample of which is now held at Kew because it is not normally associated with hawthorn. The insects galls seen beneath the fungus one year have yet to reveal their creators, probably a fly. There is also an impressive multi-stemmed Midland thorn *C. laevigata*. This tree forks below ground like a coppice or bundle planting.

By far the most unusual *Crataegus* is a large American thorn that has also posed problems in identification. It appears to be sterile and of hybrid origin. It has variable leaves that are obovate to ovate, broad and waxy, often with large remote teeth, i.e. one third of the way down. The leaves are also narrowly cuneate, i.e. they have winged petioles (Figure 3). Occasionally, when the autumn weather is just right, they turn a wonderful pale yellow. The flowers have three stigmas and seventeen to nineteen stamens (Figure 4). The tree has no thorns. The fruit are large. It could be a cross between an American green thorn *C.* × *virdis*, which has winged petioles, and an American cockspur thorn, which has waxy, oval leaves. However, if, as it appears, it is a very rare hybrid, it may be impossible definitively to establish its parentage. The leaf toothing bares some similarity to *C. macrosperma var. 'Acutiloba'*.[5]

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[4] Some of Collison's *Crataegus* species have since been recognized as belonging to other genera or as being different names for the same species, so in reality the number of true *Crataegus* species planted was probably closer to fifty.

[5] This tree is listed as *C. macrosperma* 'Acutiloba' on the Tree Register (www.treeregister.org.uk) but the identification was done remotely by reference to leaves and a description. It is probably incorrect.

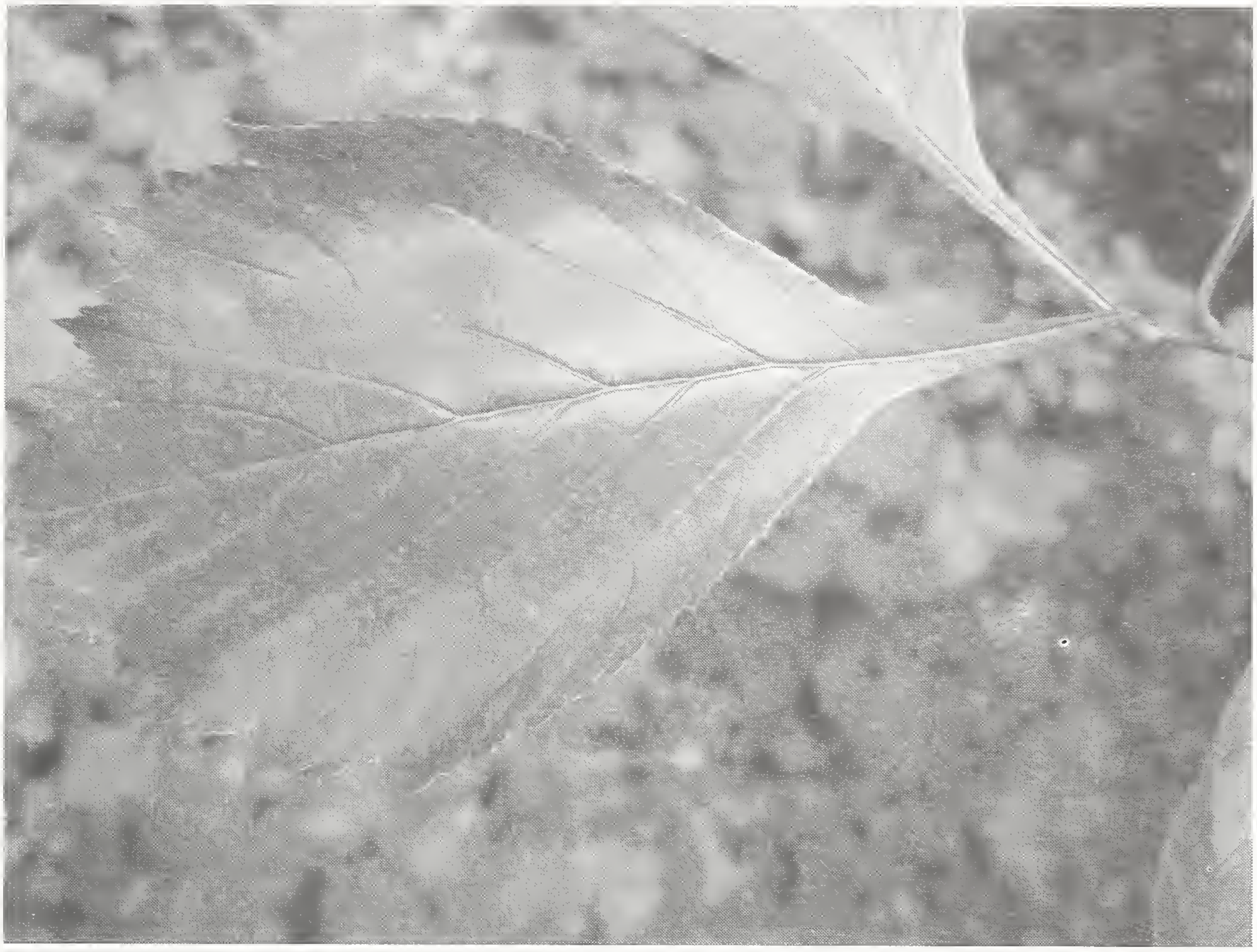

FIGURE 3. Unidentified hybrid thorn *Crataegus* × sp. (leaf). *Photo: R. Miller*

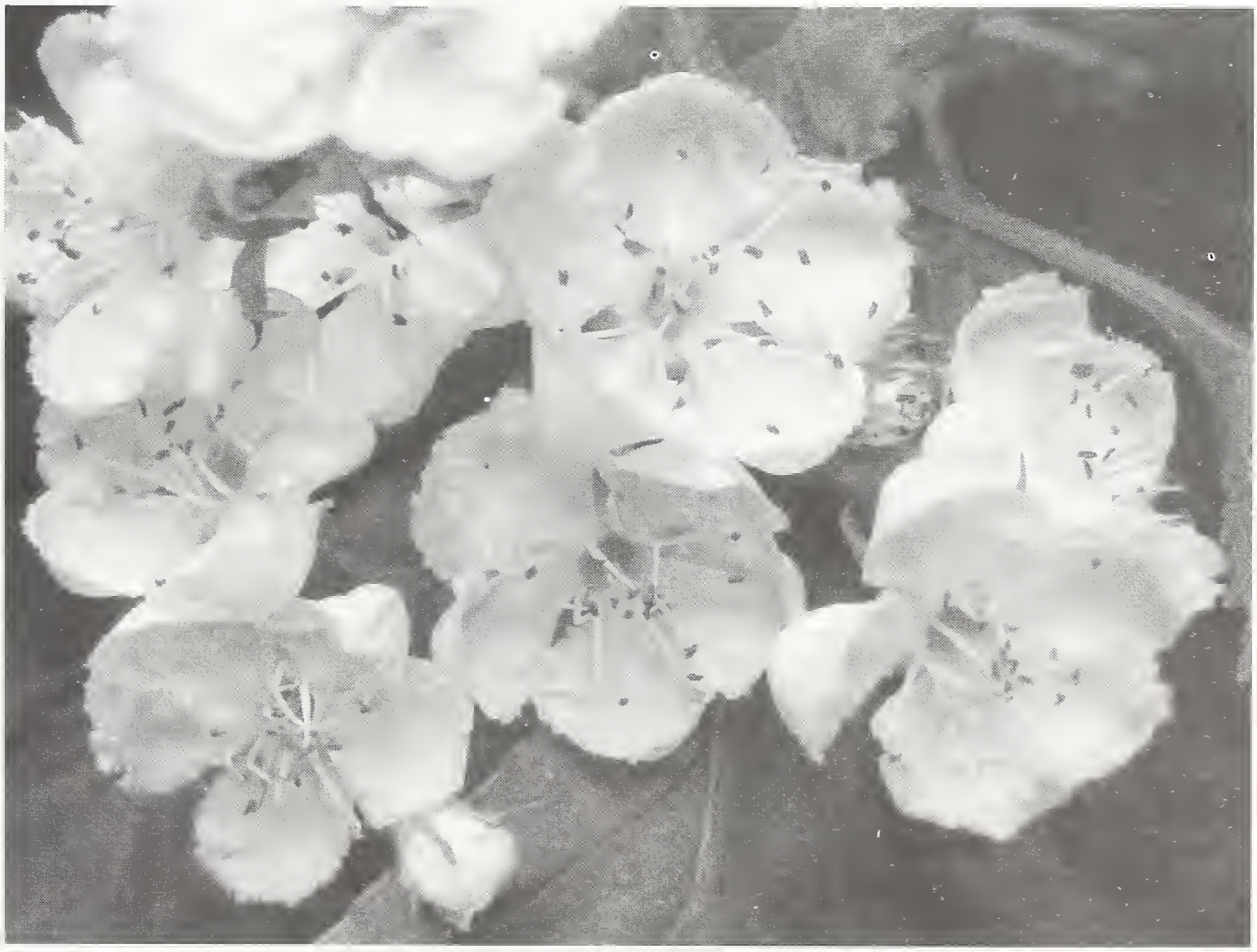

FIGURE 4. Unidentified hybrid thorn *Crataegus* × sp. (flowers). *Photo: R. Miller*

It is a veteran with a large central cavity offering niche habitats to insects, fungi and birds. The cavity is another legacy of the great storm of October 1987. When the neighbouring English oak, which both towers over and lends support to its smaller partner, split in half, the huge limb practically decapitated the thorn, leaving it with a distinct lean. However the damage acted as a form of natural pollarding and, so long as the tree continues to be supported by its clumsy partner, the hollow stem presents no immediate threat to the tree's vitality. The tree shows no sign of true heart rot, i.e. a pathogenic tree decay fungus, rather the exposed heart wood has simply succumbed to saprophytic fungal decay.

### Unusual service trees

As if the situation were not complicated enough with rare thorns and so many forms of Lucombe oak in the collection, other curiosities include unusual service trees. *Sorbus* microspecies can be difficult to differentiate. Abney has two fine examples of *Sorbus decipiens* (Figure 5). Critically endangered in Germany, this tree has no English name and closely resembles our native French Hales *S. devoniensis* (IUCN 2007). *S. decipiens* has slightly narrower leaves and fruit, and is occasionally found in parks. At least one of the Abney trees cannot date to the 1840 planting since it is on a grave dated 1864. Both trees appear to be sterile. The species is naturalized elsewhere in Britain (Stace 1997: 376).

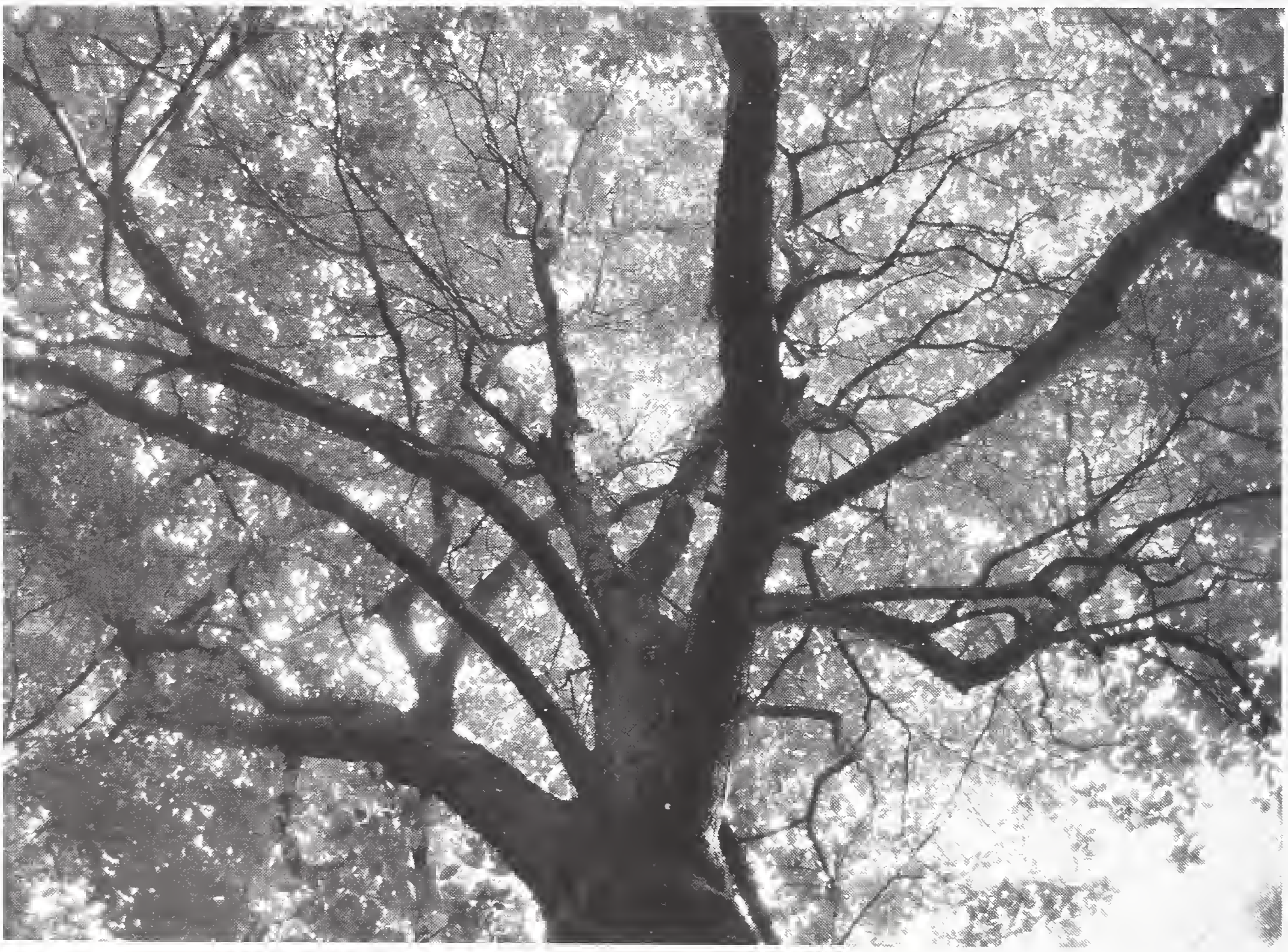

FIGURE 5. *Sorbus decipiens.* *Photo: R. Miller*

Abney's most prolific *Sorbus* is the service tree of Fontainebleau *Sorbus latifolia*. Closely related to the above, this species was first recorded in the Fontainebleau forest, south of Paris. At Abney it regenerates in some abundance. *Sorbus latifolia* and other *Sorbus* microspecies are able to reproduce by clonal seed (apomixis), a process that has led to many isolated pockets of slightly different *Sorbus* species across Europe. A very old Fontainebleau specimen died recently but still stands hosting brackets of the artist's fungus *Ganoderma applanatum* and silver leaf disease *Chondrostereum purpureum*.

## Other old trees

Other old trees that are easily overlooked in the woodland include a large specimen of the American yellow buckeye *Aesculus flava*. A graft on common horse chestnut rootstock it is a more elegant and upright tree than its European equivalent (Figure 6). Sadly in decline but remarkably resilient, a large Western catalpa *Catalpa speciosa* stands behind the derelict chapel in the centre of the site. Several fires have been set against and even in it but the tree continues to leaf and flower every year. By girth (308 cm at 1.5 m) it is a national champion. The species was only introduced in 1880 (Mitchell 1974: 387) so cannot have been part of the original planting. Several old hollies survive in remarkable condition despite also having had fires set against them. One is the variegated variety Perry's weeping holly *Ilex aquifolium 'Argenteomarginata Pendula'*. There are also a number of large narrow-leaved ash *Fraxinus angustifolia*, two of which are over four metres in girth. Other ash trees include fine examples of both weeping ash *F. excelsior* 'Pendula' and single-leaved ash *F. excelsior* 'Diversifolia'. The latter was formatively pruned to form a twin stem at one metre. A few old conifers survive including an impressive swamp cypress *Taxodium distichum* that towers over the Church Street entrance. An old Monterey cypress *Cupressus macrocarpa* is tucked away in the west of the site but this is fast succumbing to Coryneum canker, caused by the fungus *Seiridium cardinale*. Two Bhutan pines *Pinus wallichiana* grace the main thoroughfare to the chapel.

One of the Bhutan pines has finally been killed by the root disease *Phaeolus schweinitzii* after a fire was started beneath it over ten years ago. *Phaeolus schweinitzii* is unusual in London, an indicator of the complex inter-connected life cycles of decline and parasitism spawned by the Old Arboretum. Unfortunately fire has played a significant part in the demise of many specimens with five out of twelve trees that failed during high winds on 18 January 2007 showing signs of fire damage. These were mainly common ash *Fraxinus excelsior* and Italian black poplars *Populus* × *canadensis* 'Serotina' planted in 1890. Neither species compartmentalizes fungal pathogens well. The agents of decay were the common artist's fungus *Ganoderma applanatum* and *Rigidoporus ulmaris*, a brown heart rot that has had to diversify from its preferred host, elm, as a result of Dutch elm disease *Ophiostoma novo-ulmi*.

On close inspection a high proportion of the remaining specimen trees have basal damage consistent with arson suggesting that at some point someone made a determined effort to destroy all that was left of the arboretum. The arsonist has caused the premature demise of many fine trees and there are others still standing that will fail before their time. However, at least habitats have been created for hundreds of insect and fungal species because the vandal has accelerated some of Abney's trees into veterans, i.e. trees with cavities and other niche habitats, adding to the site's biodiversity.

## Fantastic fungi

Just as the process of succession for plants can be observed, e.g. birch scrub giving way to oak or beech, amidst the rotting wood fungal pathogens gradually give way to later decay specialists. In most urban parks fallen trees are swiftly tidied away but in Abney the whole cycle of growth and return to base elements can take its full course. Consequently, amidst the shade of the woodland canopy rarities such as the vibrant orange toadstool *Pluteus aurantiorugosus* can be found on the remains of trees that died a decade ago.

Abney is remarkable in the diversity and a rarity of its fungi. Thanks to the dedication and perseverance of local amateur mycologist Gina Rackley, a remarkable 280 species of fungi have been recorded so far with new species still being found regularly. Two of the more unusual tree parasites are the annual bracket *Aurantioporus fissilis* (Figure 7) and the perennial bracket

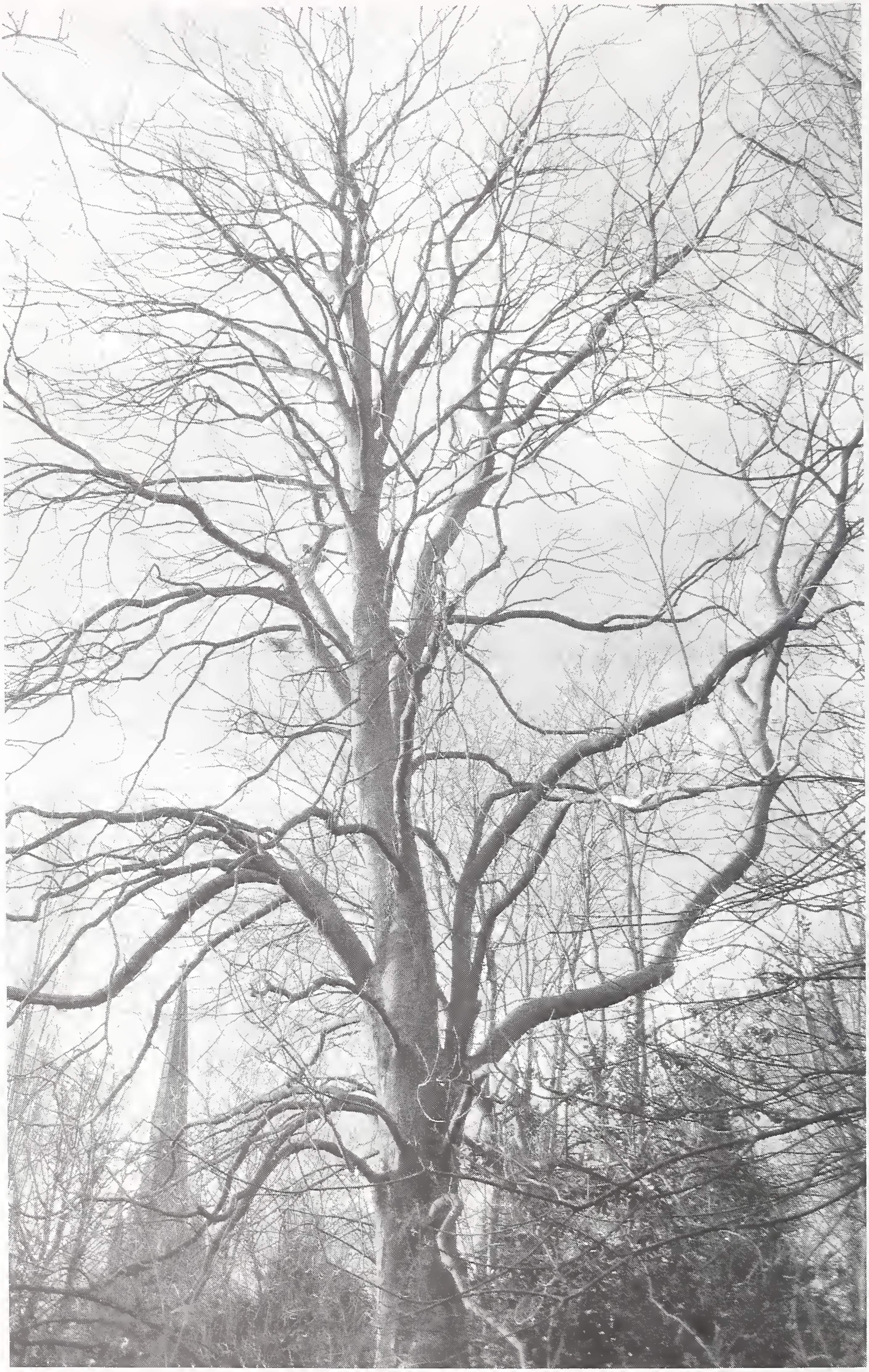

FIGURE 6. Yellow buckeye *Aesculus flava* in winter. *Photo: R. Miller*

*Perenniporia fraxinea* (Figure 8). Both produce magnificent growths. The former is rather rare and has yet to cause appreciable damage to its host, a very large ash (405 cm at 1.5 m). The latter has recently killed a smaller mature ash and is probably more common than records suggest; it is often misidentified as *Rigidoporus ulmarius*.

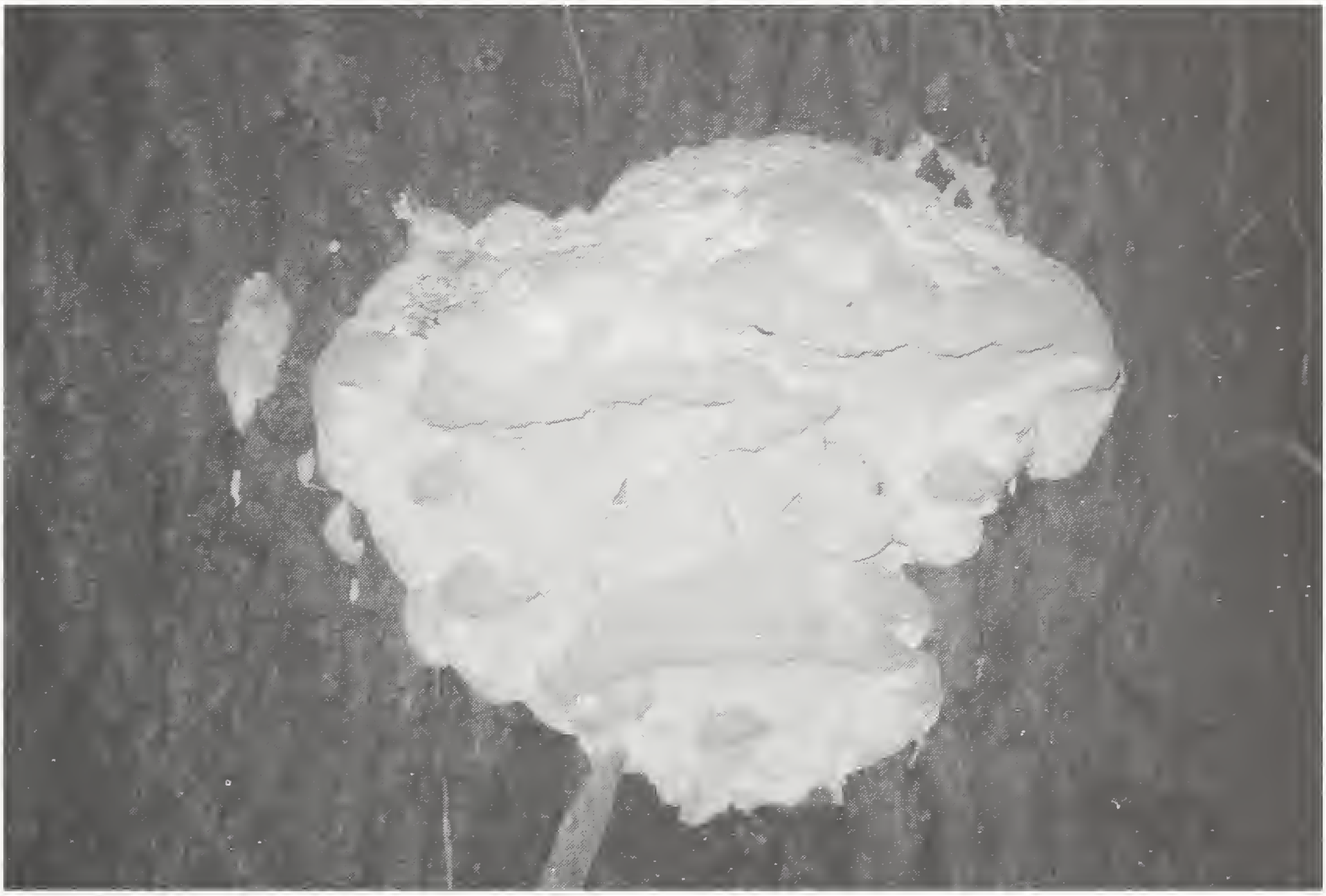

FIGURE 7. *Aurantioporus fissilis* annual bracket on ash *Fraxinus excelsior.* *Photo: R. Miller*

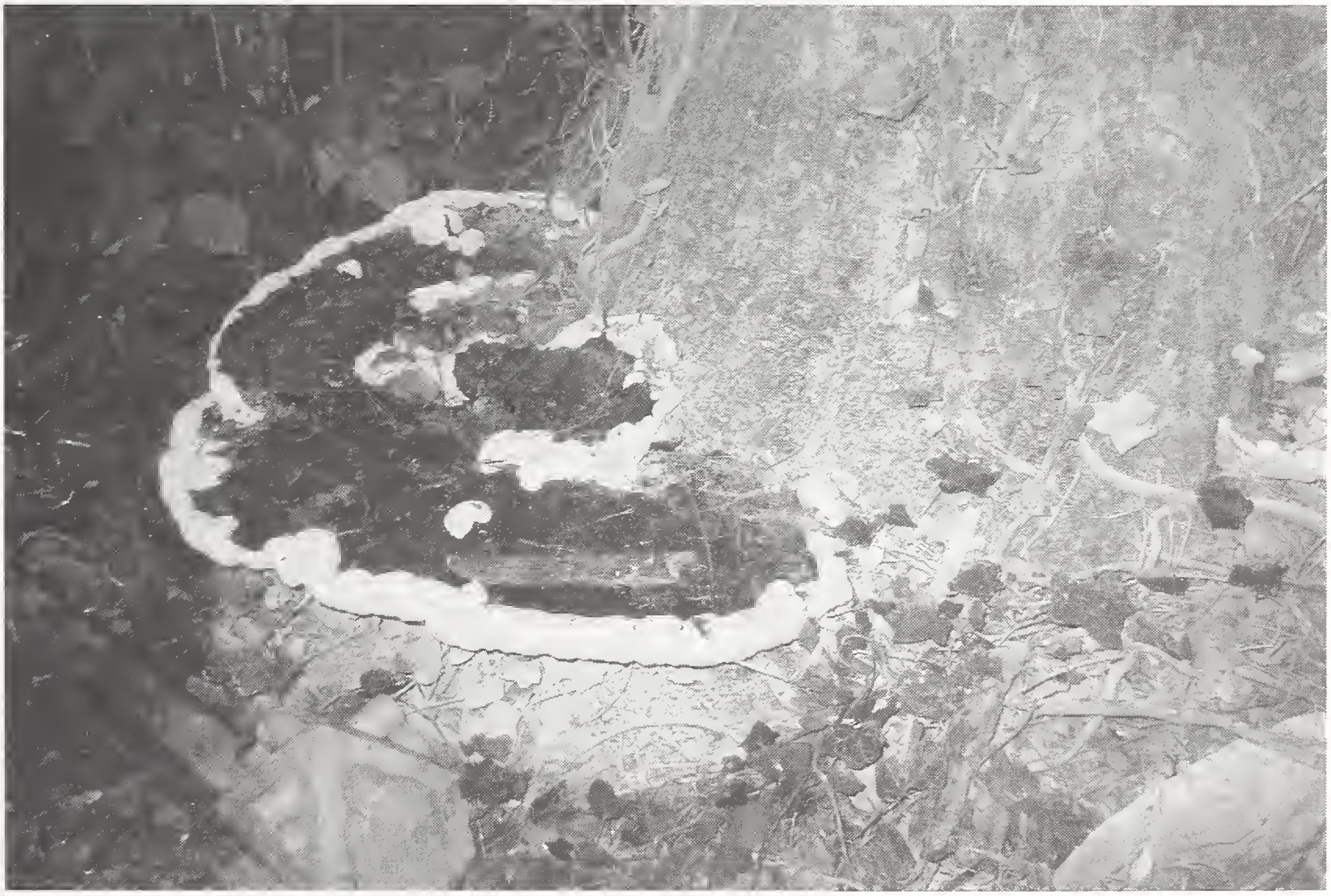

FIGURE 8. *Perenniporia fraxinea* perennial bracket on ash *Fraxinus excelsior.* *Photo: R. Miller*

## Abney's complex woodland

It is easy to become obsessed with the rarity of the old arboretum trees and to miss the fact that more than 95 per cent of the trees at Abney were not planted by human hand. In this extraordinary woodland the surprises and rarities are not restricted to the legacies of Victorian plantsmen. The current woodland is dominated to the north by ash, to the south by sycamore and birch, but that is only a tiny part of the picture. In total these three species perhaps account for some 50–60 per cent of the tree cover but they share their wood with another 172 species (including climbers and shrubs), of which an incredible 67 are also naturally regenerating. There are 49 native species. Furthermore the woodland is diverse in more than just species. The age and physical structure are also well mixed. There are veteran trees, new seedlings and everything else between. Similarly, because the woodland is basically natural the vertical and horizontal structure is also excellent. This variety in the height of canopy with good field and shrub layers is essential to many birds and insects. Blackcaps sing from hidden perches within the shrubbery, whilst roses *Rosa* spp., brambles *Rubus* spp. and Japanese spindle *Euonymus japonicus* hide hundreds of blackbirds, wrens, robins and dunnocks. Abney boasts both quantity and quality of habitat, supporting small armies of species usually found only in small numbers, if at all, in London. Interesting migrants include buzzards, red kites and pied flycatchers. Sparrowhawks breed successfully most years.

Thorns again form a significant part of the mosaic accounting for around 10 per cent of total tree cover. There are at least four naturally regenerating *Crataegus* species including both natives, common hawthorn *C. monogyna* and Midland hawthorn *C. laevigata*. Pink-flowering varieties of each also occur naturally, presumably derived from lost cultivars. In addition there are a few broad-leaved cockspurthorn *C. persimilis* 'Prunifolia', one of which is a

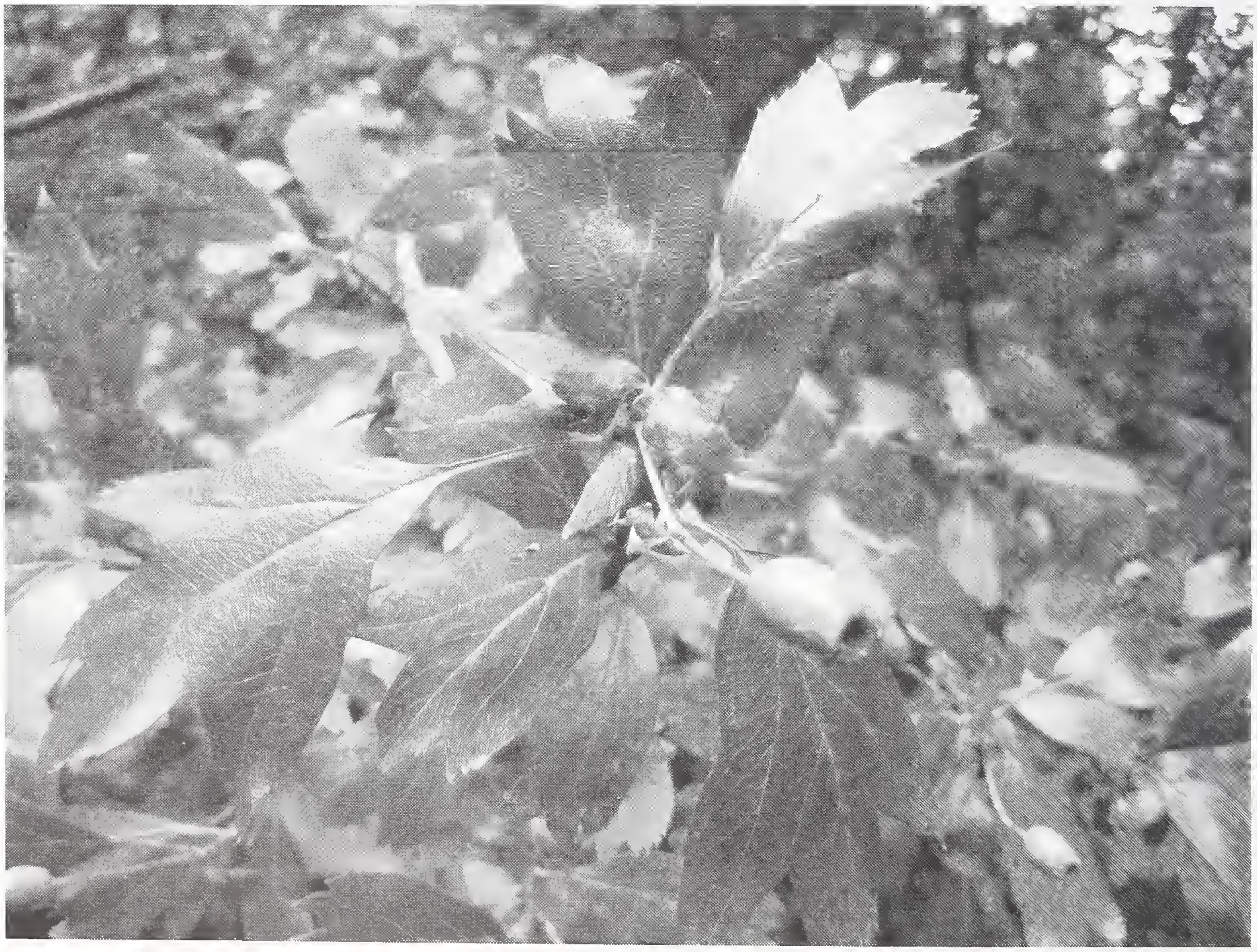

FIGURE 9. Various-leaved or Caucasian hawthorn *Crataegus heterophylla* (leaf and fruit).
*Photo: R. Miller*

substantial tree (but not apparently planted). Most significant is the very sizeable number of various-leaved or Caucasian hawthorn *C. heterophylla*. These occur all over the site and are particularly noticeable in late winter as the first trees to leaf (Figure 9). Sheltered saplings are often in leaf by late January, even before the cherry plums *Prunus cerasifera* are in flower. Abney is noted as having the greatest collection of naturalized Caucasian hawthorn anywhere in the country. Presumably these derive from long-departed arboretum specimens. Does their success in colonizing the site tell us anything about the London microclimate? Certainly they would suffer if hard frosts were more common. Thanks to their rarity Caucasian hawthorns are almost as plentiful as native may trees. This is one of three species of southerly provenance to have flourished in Abney's woodland.

An exciting but as yet undetermined issue is the possibility of hybrid thorns. The native hybrid thorn *C.* × *media* (a cross between common and Midland hawthorn) is almost certainly present and even the much rarer hybrid Caucasian hawthorn (*C. monogyna* × *C. heterophylla*), known at a wooded cemetery in Surrey, might occur (Stace 1997: 397). It appears that the giant old American thorn has had little if any part in the regeneration on site.

Interesting native species regenerating at Abney include: small-leaved lime *Tilia cordata*, yew *Taxus baccata*, spindle *Euonymus europaeus*, box *Buxus sempervirens*, and single-leaved ash *Fraxinus excelsior* 'Diversifolia'.

### *Quercus* questions

Once again however, it is when one considers the oaks that the situation gets complicated. As outlined above the Abney gene pool includes up to six fertile turkey/cork oak hybrids, as well as a holm/English oak hybrid and a mature English oak. All of which means that identifying species amongst the large variety of oak regeneration in Abney is a bit of a minefield, if not an impossibility. Worse still, we now know there were no less than twenty-one different Lucombe oak cultivars planted, in addition to the Fulham oak and Ragnal oak.

Superficially, some of the oak regeneration in Abney resembles Turkey oak and certainly *Q. cerris* genes are strongly represented. The huge diversity encompassed by this very variable species means it is difficult confidently to rule it out when trying to describe some of Abney's more unusual oaks. However, seedlings from hybrids tend to revert towards one or other parent species so similarity to *Q. cerris* is to be expected with some self-fertilized or back-crossed Lucombe oak regeneration. Indeed the diversity of unusual young oaks at Abney can only be explained by naturalized Lucombe oaks. An unstable hybrid, Lucombe oak is a promiscuous and very variable tree. And to make matters more complicated, leaves vary considerably even within each tree.

Certainly the woodland includes naturalized *Q.* × *hispanica* (Figure 10). As expected these display a variety of characteristics inherited from either parent and whilst some do resemble Turkey oak they retain the ability to confuse with curious combinations of corky bark or bizarrely shaped leaves. Consequently, even the more *Q. cerris*-like regeneration requires careful examination if peculiarities of Abney's unique oak wood are not to be overlooked. Morphological variation is to be expected with *Q.* × *hispanica*.

Further study is required to determine to what extent the hybrid oak regeneration is also influenced by the Turner's oak or mature English oak. There are English oak saplings and even semi-mature trees but there are also hard-to-categorize seedlings with barely lobed, semi-evergreen, obovate leaves that suggest *Q. robur* crosses. As can be found almost anywhere there are invasive evergreen holm oaks. However, even with the considerable variation that occurs naturally amongst the leaves of young holm oak it is difficult to account for some of the oversized, triangular lobed, almost glabrous-leaved saplings that occur at Abney. Turner oak back crosses with holm oak are fairly common and other combinations may be possible.

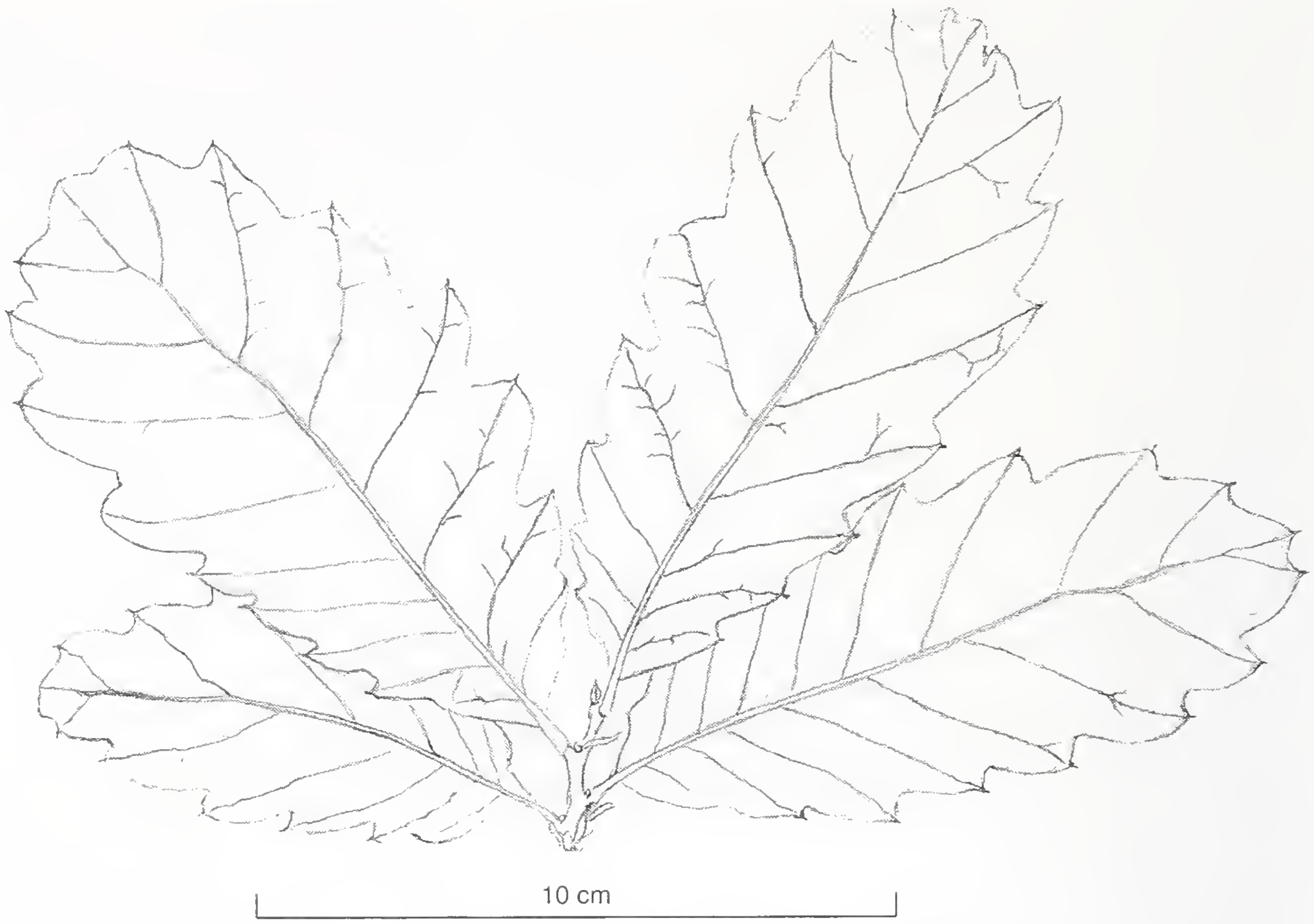

FIGURE 10. Leaf drawing from naturalized semi-mature *Quercus* × *hispanica*.
*Artist: Gina Rackley*

Nearby Clissold Park has several mature Turkey oaks, English oaks and holm oaks. The prevailing wind carries their pollen towards Abney. The East Reservoir Nature Reserve just to the north also requires a mention since pollen from its numerous mature English oaks and Turkey oaks may play its part in Abney's story.

### Sycamore meets its match

Sycamore inevitably rears its crown in Abney but this much-maligned, wildlife-friendly species is a victim of global warming. Although it supports relatively few insect species, sycamore hosts large numbers of the aphids, *Drepanosiphum acerinum* and *D. platanoidis*, which in turn attract birds and other insects. Uniquely vulnerable to its own fungal pathogen, sooty bark disease *Cryptostroma corticale*, sycamore has performed a valuable function as a woodland pioneer at Abney. Together with native ash and birch, sycamore has occupied the first stage of woodland succession. However, whereas elsewhere this prodigious multiplier dominates and becomes a major weed, at Abney sooty bark disease has almost halted its reign. More effective than efforts at control by felling and glyphosate poisoning, squirrels and unusually hot summers have spread the disease right across the site killing hundreds of trees.

*Cryptostroma* is thermophilic and is known to increase dramatically in potency after hot summers. In other circumstances trees compartmentalize the disease loosing only the odd branch, but after hot weather the fungus spreads into sapwood killing trees en masse (Strouts and Winter 2000: 257). This is because trees rely on the anaerobic conditions in saturated sapwood to restrict growth of fungal hyphae. Drought creates more favourable conditions because reduced moisture within the wood results in more oxygen available for the fungus. Squirrels inadvertently carry the spores from tree to tree and it seems removal of ivy from trees also helps spread the disease as both wind and squirrel distribution of spores are increased as access to the bark is greater.

Since Abney has a healthy diversity of other pioneers, especially ash and birch, and second-generation succession species; e.g. oaks, elms, service trees and thorns, the demise of the sycamore is of little consequence. It has done its job and now does another in creating both standing and fallen dead wood across the site. And in its very particular death it provides food for the humble wood mouse *Apodemus sylvaticus*. The mice feed on the black layer of fungal spores that occur beneath the bark. Safe high in the canopy, the tiny rodents scrape off the nutritious fungus with their teeth leaving telltale marks on fallen branches.

## Dead wood and veteran trees

The backbone of a diverse woodland is its deadwood. The more of it, and variety of its forms, the more insects and fungi the woodland can sustain. Although much work still needs to be done in identifying Abney's insect population, excellent beginnings have been made by local naturalist Tony Butler. His records of white letter hairstreaks *Satyrium w-album* have demonstrated the importance of Abney's elm regeneration for this threatened species. English elm *Ulmus procera*, wych elm *U. glabra* and Huntingdon elm *U.* × *hollandica* 'Vegata' suckers appear all over the site arising from root systems dating back to eighteenth century trees planted during the era of Abney House and Fleetwood House. Amidst the dense woodland canopy elm suckers often attain a height of twelve metres before being found by bark beetles *Scolytus scolytus* carrying Dutch elm disease. The premature death of sycamores and elm suckers is particularly advantageous in this young woodland creating as it does natural standing dead wood habitats usually only found in more mature woodland. Again diversity is key and standing dead trees with wood rotting from the inside out (cf. ring barking to create dead trees) have their own specific habitat niches for fungi and invertebrates. The invertebrates living in and off the deadwood in turn feed other species including good numbers of great spotted woodpeckers with several pairs breeding in old ash trees every year. Occasionally green woodpeckers enlarge holes made by their black-and-white cousins and also breed. The ash contributes to the woodpeckers' diet with larvae of the ash bark beetle *Hylesinus varius*.

In addition to young dead and decaying sycamores and elms, Abney has mature dead and dying poplars, thorns, service trees, ash and pine. Because access is largely defined by the historic layout of the cemetery paths, trees away from paths can be safely left to decay where they are without the need for excessive health and safety pruning or felling. Indeed, the low intervention approach of the Cemetery Trust and the Council's arboriculture unit, albeit partly forced by lack of funding, has greatly assisted in the development of a vibrant deadwood habitat. Tawny owls breed in large cavities in the hybrid black poplars, rearing two owlets in 2008. Historic pollarding has led to decay at just the right height and the abundant ivy *Hedera helix* provides added cover. Attractive cardinal beetles *Pyrochroa serraticornis*, whose larvae live in rotting wood, are another common sight. The diversity of both living and dead trees makes Abney's woodland a biodiversity treasure more than worthy of its status as a London SINC.

## Chestnuts survive

The complex pathology of the troubled horse chestnut *Aesculus hippocastanum* requires a paper, if not a volume, of its own. However, the plight of Abney's chestnuts appears to be less ominous than those in neighbouring Clissold and Springfield Parks, or indeed most London parks. Aside from the key difference that in Abney chestnuts freely regenerate by seed, creating a constant supply of semi-mature and sapling trees to replace their ageing parents, there also appears to be no bleeding canker *Pseudomonas syringae* pathovar. *aesculi* in Abney. Whilst horse chestnut leaf miner moths *Cameraria ohridella* are inevitably present the bacterial bark disease which is killing and crippling so many chestnuts across south-east England is strangely absent. Consequently, whereas trees in nearby parks loose their bark and become infected with various secondary agents (e.g. oyster fungus *Pleurotus oysteratus*, velvet shank *Flammulina velutipes* and dryad's saddle *Polyporus squamosus*), Abney's chestnut trees live on into old age as fairly healthy veterans. *Rigidoporus ulmarius* frequently hollows out the old trees without undermining their physiology in any way, although it can lead to structural failure.

Abney's largest chestnut has a story all of its own. Damaged in October 1987, loosing a limb from its main stem at about 12 metres, rot set in and thirteen years later, in October 2000, the whole top blew off leaving a squat 10-metre stump. Undeterred, the tree put on new growth and now sports a significant crown of healthy young branches. Pollarded by nature the tree needs only occasional surgery to restrict the weight on limbs overhanging the path (known as Great Elm Walk, the elms are alas long gone but for suckers). So rather than being felled it remains as a veteran, offering important niche habitats to fungi, insects, birds and mammals. At its base a huge *Rigidoporus ulmarius* bracket, over a metre wide, explains the decay.

So Abney's old chestnuts continue to nurse their offspring into their place when in other parks old trees are dying by the dozen and even recently planted trees as young as five years succumb to *Pseudomonas*. More research is required into the precise mechanism of infection but perhaps the competition of so many other bacteria and fungi has so far prevented *Pseudomonas* from becoming established in Abney's woodland. Certainly the absence of mechanical damage caused by mowing operations in parks is a major advantage to Abney's chestnuts. The frequency of bark damage in urban parks and lack of understanding as to its dangers is a major contribution to the rapid decline of thousands of old trees across the country.

## Exotics that enjoy the London climate

As mentioned above there are dozens of self-seeded service trees of Fontainebleau spread far and wide across the site by stock doves and other birds. Saplings even appear in Springfield Park a mile to the north-east. Interestingly, the native common whitebeam *Sorbus aria* struggles to regenerate in Abney with only a single semi-mature specimen and no self-seeded saplings. Likewise, Swedish whitebeams *Sorbus intermedia* and Finnish whitebeams *Sorbus hybrida*, found all around Stoke Newington as street trees, have only occasionally set seed in Abney. Admittedly the Fontainebleau trees have the advantage of plentiful seed sources on site but there were mature Swedish whitebeam on site and birds must regularly bring in *Sorbus* seed. A few Swedish whitebeam have made it in, and others were planted in the 1990s together with a few common whitebeam and wild service *Sorbus torminalis*. However, it is the dominance of the more southerly Fontainebleau that is significant. Its success would appear to be adaptive as well as assisted naturalization. It makes sense that this European hybrid cousin of our native whitebeam and wild service tree would find warm London temperatures to its liking.

## Climate change experiment

Insight into the reality of species hybridization and naturalization is valuable in its own right but Abney's puzzle for *Quercus*, *Crataegus* and *Sorbus* botanists also has potential lessons for the study of climate change. The success of these southerly provenance European species in Abney's woodland represents a living experiment in climate adaptation. For around fifty years trees and shrubs have had an opportunity to colonize an inner London microclimate. The relative success of *Q.* × *hispanica, Sorbus latifolia* and *Crataegus heterophylla* may offer a guide to future planting as we adapt to a hotter, drier London environment. The reality of climate change is already forcing modifications to species selection and after-care regimes in planting schemes across London as less water demanding, more drought-tolerant trees are considered. There is much talk of southerly provenances and perhaps Abney's unplanned experiment lends weight to those views. Water-loving species such as willow *Salix* spp. and giant redwood *Sequoiadendron giganteum* are struggling.

## Conclusions

The diversity of life that Abney's woodland supports is as important a treasure now as was the Loddiges arboretum in 1840. Then, far-sighted early Victorian plantsmen understood the need to provide open space for the urban masses combined with access to the fast-developing appreciation of new and exotic trees. The existing diversity of woody species and substantial carrying capacity for hundreds of other species, many as yet unrecorded, makes Abney's woodland a very important site for biodiversity in London. If we can show equal foresight in valuing and studying the huge array of species that have naturally colonized the Victorian remains we might learn lessons to our own benefit.

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## References

COLLISON, G. 1840. *Cemetery Interment — Descriptions of Père la Chaise, the Eastern Cemeteries, and those of America; and more particularly of the Abney Park Cemetery Company.*

IUCN. 2007. *International Union for the Conservation of Nature and Natural Resources,* Red List of Threatened Species.

JOHNSON, O. and MOORE, D. 2004. *Tree guide.* Collins.

LOUDON, J. C. 1838. *Arboretum et Fruticetum,* Part III.

LOUDON, J. C. 1843. *On Laying Out Cemeteries.*

McARDLE, A. J. and SANTAMOUR, F.S. Jr. 1987 Cultivar Checklist of *Quercus* (excluding subg. *Quercus*). *J. Arboriculture* **13**: 250–256.

MITCHELL, A. 1994. The Lucombe oaks. *Plantsman* **15** (4): 216–224.

MITCHELL, A. 1974. *A field guide to the trees of Britain and northern Europe.* Collins, London.

PLANT, C.W. 1993. *Larger moths of the London Area.* London Natural History Society.

RUMSEY, F., RUSSELL, S. and WILTSHIRE, E. 2006. A preliminary molecular investigation to characterize and identify Fulham Oaks, their progeny and related cultivars in London. *Lond. Nat.* **85**: 39–49.

SOLMAN, D. 1995. Loddiges of Hackney — the largest hothouse in the world.

STACE, C. 1997. *New flora of the British Isles.* Ed. 2. Cambridge University Press.

STROUTS, R.G. and WINTER, T.G. 2000. *Diagnosis of ill health in trees.* The Stationery Office. (See also YOUNG, C. W. T. 1978. *Sooty bark disease of sycamore.* HMSO.)

WILTSHIRE, E. 2004*a*. The Fulham oak in London. *Lond. Nat.* **83**: 29–39.

WILTSHIRE, E. 2004*b*. 'Very rare and distinct' form of Lucombe oak in Abney Park. *Lond. Nat.* **83**: 41–43.

WILTSHIRE, E. and COOMBES, A. 2001. *Quercus* × *turneri* Willd. — a rare London hybrid oak. *Lond. Nat.* **80**: 21–27.

TABLE 1. Trees of Abney Park Cemetery.
s = seed; suc = sucker; h = historic; r = recent.

| Genus | Species | Subspecies/ cultivar | Common name | Natural regen. | Planted |
|---|---|---|---|---|---|
| *Acacia* | *dealbata* | | Mimosa | | r |
| *Acacia* | *melanoxylon* | | Blackwood | | r |
| *Acer* | *campestre* | | Field maple | s | r |
| *Acer* | *capillipes* | | Red snake bark maple | | r |
| *Acer* | *cappadocicum* | Aureum | Golden Cappadocian maple | | r |
| *Acer* | *cappadocicum* | | Cappadocian maple | | r |
| *Acer* | *davidii* | George Forrest | Père David's maple | | r |
| *Acer* | *palmatum* | Atropurpureum | Purple Japanese maple | | r |
| *Acer* | *palmatum* | | Smooth Japanese maple | | r |
| *Acer* | *pensylvanicum* | | Moosewood | | r |
| *Acer* | *platanoides* | Goldsworth Purple | Norway maple | | r |
| *Acer* | *platanoides* | | Norway maple | s | r |
| *Acer* | *pseudoplatanus* | | Sycamore | s | h |
| *Acer* | *pseudoplatanus* | | Variegated sycamore | s | |
| *Aesculus* | *flava* | | Yellow buckeye | | h |
| *Aesculus* | *hippocastanum* | | Horse chestnut | s | h, r |
| *Aesculus* | *indica* | | Indian chestnut | | r |
| *Aesculus* | × *carnea* | | Red horse chestnut | | h |
| *Aesculus* | × *hybrida* | | Hybrid buckeye | | r |
| *Ailanthus* | *altissima* | | Tree of heaven | suc | h, r |
| *Alnus* | *cordata* | | Italian alder | | r |
| *Alnus* | *glutinosa* | | Common alder | s | r |
| *Alnus* | *incana* | | Grey alder | | r |
| *Amelanchier* | *lamarckii* | | Snowy mespilus | | r |
| *Araucaria* | *auraucaria* | | Monkey puzzle | | r |
| *Arbutus* | *unedo* | | Strawberry tree | | r |
| *Betula* | *ermani* | | Erman's birch | | r |
| *Betula* | *papyrifera* | | Paper-bark birch | | r |
| *Betula* | *pendula* | Laciniata | Swedish birch | | r |
| *Betula* | *pendula* | | Silver Birch | s | h, r |
| *Betula* | *pubescens* | | Downy birch | s | h |
| *Betula* | *utilis* | jacquemonti | Himalayan birch | | r |
| *Betula* | *utilis* | | Himalayan birch | | r |
| *Betula* | × *aurata* | | Hybrid birch | s | |
| *Carpinus* | *betulus* | Fastigiata | Hornbeam | | r |
| *Carpinus* | *betulus* | | Hornbeam | s | h, r |
| *Castanea* | *sativa* | | Sweet chestnut | | r |
| *Catalpa* | *bignonioides* | | Indian bean tree | | r |
| *Catalpa* | *speciosa* | | Western catalpa | | h |
| *Cedrus* | *atlantica* | glauca | Blue Atlas cedar | | r |
| *Cedrus* | *atlantica* | | Atlas cedar | | r |

| **Genus** | **Species** | **Subspecies/ cultivar** | **Common name** | **Natural regen.** | **Planted** |
|---|---|---|---|---|---|
| *Cedrus* | *deodara* | | Deodar cedar | | r |
| *Cedrus* | *libani* | | Cedar of Lebanon | | r |
| *Cercidiphyllum* | *japonicum* | | Katsura tree | | r |
| *Chamaecyparis* | *lawsoniana* | Columnaris | Lawson cypress | | r |
| *Chamaecyparis* | *lawsoniana* | Ellwoodii | Lawson cypress | | r |
| *Chamaecyparis* | *lawsoniana* | | Lawson cypress | s | h, r |
| *Corylus* | *avellana* | | Hazel | s | r |
| *Corylus* | *colurna* | | Turkish hazel | | r |
| *Crataegus* | *heterophylla* | | Various-leaved hawthorn | s | |
| *Crataegus* | *laevigata* | | Midland hawthorn | s | h |
| *Crataegus* | *macrosperma* | Acutiloba | | | r |
| *Crataegus* | *monogyna* | Laciniata | Cut-leaved hawthorn | s | |
| *Crataegus* | *monogyna* | | Common hawthorn | s | h, r |
| *Crataegus* | *persimilis* | Prunifolia | Broad leaved cockspur | s | r |
| *Crataegus* | × | | Hybrid American thorn | | h |
| *Crataegus* | × *media* | | Hybrid thorn | s | |
| *Cupressus* | *macrocarpa* | | Monterey cypress | | h |
| *Cupressus* | *sempervirens* | | Italian cypress | | r |
| *Davidia* | *involucrata* | Vilmoriniana | Dove Tree | | r |
| *Eucalyptus* | *gunnii* | | Cider gum | | r |
| *Euonymus* | *europaeus* | | Native spindle | s | r |
| *Fagus* | *sylvatica* | Fastigiata | Dawyck beech | | r |
| *Fagus* | *sylvatica* | Heterophylla | Fern-leaved beech | | r |
| *Fagus* | *sylvatica* | purpurea | Copper beech | | r |
| *Fagus* | *sylvatica* | | Common beech | | r |
| *Ficus* | *carica* | | Fig | | r |
| *Frangula* | *alnus* | | Alder buckthorn | | r |
| *Fraxinus* | *angustifolia* | oxycarpa Raywood | Raywood ash | | r |
| *Fraxinus* | *angustifolia* | | Narrow-leafed ash | | h |
| *Fraxinus* | *excelsior* | Diversifolia | Single-leafed ash | s | h |
| *Fraxinus* | *excelsior* | Pendula | Weeping ash | | h, r |
| *Fraxinus* | *excelsior* | | Common ash | s | h |
| *Fraxinus* | *ornus* | | Manna ash | | r |
| *Ginkgo* | *biloba* | | Maidenhair tree | | r |
| *Gleditsia* | *triacanthos* | Sunburst | Honey locust | | r |
| *Ilex* | *aquifolium* | Argenteomarginata Pendula | Perry's weeping holly | | h |
| *Ilex* | *aquifolium* | Pendula | Weeping holly | | h |
| *Ilex* | *aquifolium* | Pyramidalis | | | h |
| *Ilex* | *aquifolium* | | Common holly | s | h, r |
| *Ilex* | × *altaclerensis* | Golden King | Variegated holly | | r |
| *Ilex* | × *altaclerensis* | Wilsonii | | | r |
| *Ilex* | × *altaclerensis* | | Highclere holly | s | h |
| *Juglans* | *nigra* | | Black walnut | | r |

| **Genus** | **Species** | **Subspecies/ cultivar** | **Common name** | **Natural regen.** | **Planted** |
|---|---|---|---|---|---|
| *Juglans* | *regia* | | Common walnut | | r |
| *Juniperus* | *chinensis* | | Chinese juniper | | r |
| *Koelreuteria* | *paniculata* | | Golden rain tree | | r |
| *Liriodendron* | *tulipifera* | | Tulip tree | | r |
| *Malus* | *domestica* | | Cultivated apple | s | r |
| *Malus* | *tschonoskii* | | Pillar apple | | r |
| *Mespilus* | *germanica* | | Medlar | | r |
| *Morus* | *alba* | | White mulberry | | r |
| *Nyssa* | *sinensis* | | Chinese Tupelo | | r |
| *Olea* | *europaea* | | Olive | | r |
| *Ostrya* | *carpinifolia* | | European hop hornbeam | | r |
| *Picea* | *pungens* | Glauca | Blue Colorado spruce | | r |
| *Pinus* | *nigra* | Maritima | Corsican pine | | h |
| *Pinus* | *sylvestris* | | Scot's pine | | r |
| *Pinus* | *wallichiana* | | Bhutan pine | | h, r |
| *Platanus* | × *acerifolia* | | London plane | | h |
| *Populus* | *canescens* | | Grey poplar | | r |
| *Populus* | *nigra* | Plantierensis | Plantier's poplar | | h |
| *Populus* | *tremula* | | Aspen | | r |
| *Populus* | × *canadensis* | Serotina | Italian black poplar | | h |
| *Prunus* | *avium* | | Wild cherry | s, suc | r |
| *Prunus* | *cerasifera* | Nigra | Purple cherry plum | | r |
| *Prunus* | *cerasifera* | Pissardii | Pissard's plum | | r |
| *Prunus* | *cerasifera* | | Cherry plum | s | r |
| *Prunus* | *domestica* | | Plum | | r |
| *Prunus* | *insititia* | | Damson | s | h |
| *Prunus* | *laurocerasus* | Otto Luyken | Cherry laurel | | r |
| *Prunus* | *laurocerasus* | | Cherry laurel | s | r |
| *Prunus* | *lusitanica* | | Portugal laurel | s | r |
| *Prunus* | *padus* | | Bird cherry | | r |
| *Prunus* | *serrula* | | Tibetan cherry | | r |
| *Prunus* | *serrulata* | cultivar | Japanese flowering cherry | | r |
| *Prunus* | *serrulata* | cultivar | Japanese flowering cherry | | r |
| *Prunus* | *serrulata* | Kanzan | Japanese flowering cherry | | r |
| *Prunus* | *serrulata* | Umineko | Seagull cherry | | r |
| *Prunus* | *spinosa* | | Sloe, blackthorn | s | r |
| *Pseudotsuga* | *menziesii* | | Douglas fir | | r |
| *Pyrus* | *calleryana* | | Chanticleer pear | | r |
| *Pyrus* | *pyraster* | | Wild pear | | r |
| *Quercus* | *bicolor* | | Swamp white oak | | r |
| *Quercus* | *cerris* | | Turkey oak | s | |
| *Quercus* | *frainetto* | | Hungarian oak | | r |
| *Quercus* | *ilex* | | Holm oak | s | h |

| **Genus** | **Species** | **Subspecies/ cultivar** | **Common name** | **Natural regen.** | **Planted** |
|---|---|---|---|---|---|
| *Quercus* | *phellos* | | Willow-leaved oak | | r |
| *Quercus* | *robur* | Fastigiata | Cypress oak | | r |
| *Quercus* | *robur* | | English oak | s | h, r |
| *Quercus* | *rubra* | | Red oak | | r |
| *Quercus* | *suber* | | Cork oak | | r |
| *Quercus* | × *hispanica* | Fulhamensis | Fulham oak | | h |
| *Quercus* | × *hispanica* | Heterophylla | Variable-leaved Lucombe oak | | h |
| *Quercus* | × *hispanica* | Latifolia | Broad-leaved Lucombe oak | | h |
| *Quercus* | × *hispanica* | Pendula | Weeping Lucombe oak | | h |
| *Quercus* | × *hispanica* | Ragnal | Ragnal oak | | h |
| *Quercus* | × *hispanica* | | Lucombe hybrids | s | |
| *Quercus* | × *turneri* | Pseudoturneri | Turner's oak | | h |
| *Rhamnus* | *cathartica* | | Purging buckthorn | | r |
| *Robinia* | *pseudoacacia* | Frisia | Golden robinia | | r |
| *Salix* | *caprea* | | Goat willow | s | r |
| *Salix* | *cinerea* | | Grey willow | | r |
| *Salix* | *fragilis* | | Crack willow | | r |
| *Sambucus* | *nigra* | Laciniata | Parsley-leaved elder | | h |
| *Sambucus* | *nigra* | | Elder | s | h |
| *Sequoiadendron* | *giganteum* | | Giant redwood | | r |
| *Sorbus* | *aria* | | Common whitebeam | s | r |
| *Sorbus* | *aucuparia* | | Rowan | s | h, r |
| *Sorbus* | *decipiens* | | | | h |
| *Sorbus* | *glabrascens* | | Hubei rowan | | r |
| *Sorbus* | *hybrida* | | Finnish whitebeam | | r |
| *Sorbus* | *intermedia* | | Swedish whitebeam | s | h, r |
| *Sorbus* | *latifolia* | | Fontainebleau service | s | h |
| *Sorbus* | *torminalis* | | Wild service | | r |
| *Taxodium* | *distichum* | | Swamp cypress | | h |
| *Taxus* | *baccata* | Fastigiata | Irish yew | | r |
| *Taxus* | *baccata* | | Common yew | s | r |
| *Thuja* | *plicata* | Aurea | Western red cedar | | r |
| *Thujopsis* | *dolabrata* | | Hiba | | r |
| *Tilia* | *cordata* | | Small-leaved lime | s | h, r |
| *Tilia* | *platyphyllos* | | Large-leaved lime | | r |
| *Tilia* | × *europaea* | | Common lime | | h |
| *Ulmus* | *glabra* | | Wych elm | suc | h |
| *Ulmus* | *procera* | | English elm | suc | h |
| *Ulmus* | × *hollandica* | Vegata | Huntingdon elm | suc | h |
| × *Cupressocyparis* | *leylandii* | | Leyland cypress | | r |

TABLE 2. Shrubs and climbers of Abney Park Cemetery.
s = seed; suc = sucker; h = historic; r = recent.

| **Genus** | **Species** | **Subspecies/ cultivar** | **Common name** | **Natural regen.** | **Planted** |
|---|---|---|---|---|---|
| *Aucuba* | *japonica* | maculata | Spotted laurel | s, layering | h, r |
| *Buddleja* | *davidii* | White Cloud | Butterfly bush | | r |
| *Buddleja* | *davidii* | Empire Blue | Butterfly bush | | h |
| *Buddleja* | *davidii* | Royal Red | Butterfly bush | s | h |
| *Buxus* | *sempervirens* | | Box | s, layering | h, r |
| *Ceanothus* | *thyrsiflorus* | repens | | | r |
| *Choisya* | *ternata* | | Mock orange | | r |
| *Clematis* | *vitalba* | | Traveller's joy | s, layering | |
| *Clematis* | *viticella* | Minuet | | | r |
| *Cornus* | *alba* | | Red-barked dogwood | | r |
| *Cornus* | *mas* | | Cornelian cherry | | r |
| *Cornus* | *sanguinea* | | Common dogwood | s | r |
| *Cotoneaster* | *franchetii* | | | s | |
| *Cotoneaster* | *horizontalis* | | | s | |
| *Cotoneaster* | *bullatus* | | | s | |
| *Cotoneaster* | sp. | | | s | |
| *Cytisus* | *scoparius* | | Broom | | r |
| *Euonymus* | *japonicus* | Ovatus Aureus | Japanese spindle | s | h |
| *Euonymus* | *japonicus* | | Japanese spindle | s, layering | h |
| *Fallopia* | *baldschuanica* | | Russian vine | layering | |
| *Forsythia* | × *intermedia* | | | s, layering | r |
| *Hedera* | *helix* | | Ivy | s, layering | |
| *Hypericum* | *calycinum* | | Rose of Sharon | s | r |
| *Jasminum* | *officinale* | | Jasmine | | r |
| *Leycesteria* | *formosa* | | Pheasant berry | | r |
| *Ligustrum* | *ovalifolium* | aureum | Golden privet | s | h |
| *Ligustrum* | *ovalifolium* | | Privet | s | h |
| *Lonicera* | *nitida* | | | s | |
| *Lonicera* | *periclymenum* | | Honeysuckle | s | r |
| *Mahonia* | *aquifolium* | | Oregon grape | | r |
| *Paeonia* | sp. | | Tree peony | | r |
| *Parthenocissus* | *quinquefolia* | | Virginia creeper | s | |
| *Passiflora* | *caerulea* | | Passion flower | | r |
| *Pyracantha* | *atalantioides* | Watereri | Firethorn | s | |
| *Pyracantha* | *coccinea* | Lalandei | Scarlet firethorn | s | |
| *Ribes* | *sanguineum* | | Raspberry | s, layering | |
| *Rosa* | *arvensis* | | Field | s | |
| *Rosa* | *canina* | | Dog | s | |
| *Rosa* | sp. | | Garden roses | | h, r |
| *Rubus* | *fruiticosa* | | Bramble | s, suc | |
| *Ruscus* | *aculeatus* | | | | r |

| Genus | Species | Subspecies/ cultivar | Common name | Natural regen. | Planted |
|---|---|---|---|---|---|
| *Senecio* | *greyi* | | Senecio | | r |
| *Symphoricarpos* | *albus* | | Snowberry | s, suc | r |
| *Syringa* | *vulgaris* | | Lilac | | r |
| *Ulex* | *europaeus* | | Gorse | | r |
| *Viburnum* | *lantana* | | Wayfaring tree | | r |
| *Viburnum* | *opulus* | | Guelder rose | | r |
| *Viburnum* | × *bodnantense* | | Viburnum | | r |
| *Viburnum* | *rhytidophyllum* | | Viburnum | | r |

# Book reviews

***Allee effects in ecology and conservation.*** Franck Courchamp, Luděk Berec and Joanna Gascoigne. Oxford University Press. 2008. 256 pp., 47 figures, 20 black-and-white plates. £44.95, hardback. ISBN 978 0 19 857030 1.

In 1814, flocks of millions of passenger pigeons darkened the American sky for days on end. A century later the bird was extinct. Was this catastrophic collapse entirely due to hunters' greed? Probably not — the pigeons' search for the nuts and berries on which they fed was a cooperative effort in which birds that found a food source attracted the rest of the flock to it. With fewer and fewer birds, communal foraging became less and less successful until a tipping-point was reached, beyond which starvation became inevitable. Survival of the species was dependent on a minimal population density.

The fern *Woodsia ilvensis* is widespread and common in much of the northern hemisphere but extremely rare in Britain where, as a relict from the last Ice Age, it seems to be declining to extinction, probably as a result of inbreeding which has compromised its ability to produce viable spores. Larger and more diverse populations, as in Scandinavia, are unaffected.

These are examples of Allee effects, whereby the overall 'fitness' of a species declines as its population size, or density, decreases. First recognized as a significant factor in animal communities by the American zoologist Warder Clyde Allee in 1931, these effects have many causes, such as dependence on cooperative behaviour (passenger pigeon), or genetic drift in small populations (*Woodsia*). In opposition to these mechanisms are the advantages, such as less competition for food, of a smaller population size; when the disadvantages outweigh these, the resulting demographic Allee effect can lead a species into irreversible decline. This interesting book is a beginners' primer, describing the various factors that might be involved, how their consequences are modelled mathematically, and the implications for conservation, pest control, and population management generally. Some conclusions challenge current practice. Those drawing up biodiversity action plans, for example, might ponder this: 'If Allee effects are suspected . . . it may be most efficient (if financial resources are scarce) to direct conservation efforts at maintaining large or dense populations, rather than trying to preserve and increase small, sparse populations which may no longer be viable. At the habitat level, this probably means protecting large central fragments at the expense of small, isolated or peripheral fragments.'

Only a minimal knowledge of population ecology and population genetics is assumed. Examples drawn from fields as diverse as fisheries management, plant reintroductions and butterfly conservation will interest the amateur naturalist as well as the professional ecologist for whom the book is primarily intended.

John Edgington

***Bees of Surrey.*** David W. Baldock. Surrey Wildlife Trust. 2008. 303 pp., 48 coloured plates, hardback, coloured dust jacket. ISBN 978 9556188 1 9, £16, plus £2.40 p. & p. from Atlas Sales, Surrey Wildlife Trust, School Lane, Pirbright, Woking, Surrey GU24 0JN; tel. 01483 795451; cheques payable to Surrey Wildlife Trust.

This eleventh volume in the Surrey Wildlife Trust's Atlas series is published just as we are going to press, so fortunately we can draw readers' attention to it now.

Surrey is probably the richest county in Britain for bees, supporting almost 90 per cent of the country's 250 species. This is in large part due to the fact that Surrey has a relatively warmer and drier climate than most counties, and habitats favoured by bees and wasps — the extensive heathlands, the chalk of the North Downs, and large tracts of deciduous woodland.

The book maintains the Trust's high standard of production, with an attractive eye-catching coloured dust jacket and excellent quality printing throughout. The forty-eight fine coloured plates, most with two or more images of bees and their habitats, are a delight in themselves. As a non-hymenopterist I feel they alone justify purchasing the book.

K. H. Hyatt, Editor, *Lond. Nat.*

# A further survey of mistletoe *Viscum album platyspermum* Kell. at Hampton Court Palace

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## Summary

The surveys in 2004 and 2006 of mistletoe growing on the East Front Canal Avenue at Hampton Court Palace have been repeated with the same two-year interval. In March 2008, surveyors recorded which of the 199 hybrid lime trees in the avenue were hosts to mistletoe and how many growths were apparent. The earlier surveys were reported in last year's *London Naturalist* (Marris 2007).

The 2008 survey shows that mistletoe is still spreading on the avenue. Ten new host trees were recorded, a lesser increase than in previous years. But the number of new growths was 112, a greater increase. That has brought the total to 361 growths on 104 lime trees.

Evidently there continues to be a vigorous increase in the amount of mistletoe growing on the avenue. The report speculates on the reasons for this increase.

## Introduction

In 2004 and 2006 surveys were made of mistletoe *Viscum album platyspermum* growing on the Canal Avenue of hybrid limes *Tilia* × *europaea* in the East Front Garden of Hampton Court Palace. The results of those surveys were published in *The London Naturalist* **86** (Marris 2007).

The surveys revealed that, solely by natural causes, mistletoe had populated the avenue, spreading to many trees with even more growths. The survey reported here was made with the same two-year interval, in 2008, to see if mistletoe was continuing to spread in the avenue.

Much information about mistletoe, survey method, etc. has been left out of this account. It is fully detailed in the 2007 report.

## Objective

The earlier surveys and the 2008 survey support the mistletoe Species Action Plan which is part of the Biodiversity Action Plan of the London Borough of Richmond upon Thames. Mistletoe is abundant in the Borough and one of the aims of the SAP is to survey suitable sites and publish the results.

## The survey

The 2008 survey used a similar method to the previous surveys, on the same avenue. Two or more surveyors examined the lime trees *Tilia* × *europaea* 'Koningslinde' to look for growths of mistletoe. The 199 trees in the East Front Canal Avenue of Hampton Court Palace are numbered. Recording sheets were used to show, for each tree, whether mistletoe was present; if so, the number of growths and the apparent age of the youngest growth.

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* Chairman, Mistletoe Species Action Plan Group, London Borough of Richmond upon Thames.

That last measurement was new in 2008: it was thought that the youngest growth would be convenient evidence of recent spread when the youngest growth was only one or two years old. That would indicate that it had come since the previous, 2006, survey.

The distinction between single growths, from one stem, and multiple grows from many adjacent stems, was discontinued. The size and nearness of growths on some trees had made it impossible accurately to record. For similar reasons, the age of the oldest growth was no longer recorded.

The avenue was surveyed on 17 and 31 March 2008.

### Trees with mistletoe

Of the 199 trees in the East Front Avenue, 104 were seen to have mistletoe growths in 2008, that is just over half. Table 1 shows the results for 2008 and earlier years.

TABLE 1. Number and percentage of the 199 trees with mistletoe growths.

| Year | Number of trees | Percentage |
|---|---|---|
| 1994 estimated | 0 | 0.0 |
| 1996 estimated | 1 | 0.5 |
| 1998 estimated | 3 | 1.5 |
| 2000 estimated | 20 | 10 |
| 2002 estimated | 56 | 28 |
| 2004 actual | 75 | 38 |
| 2006 actual | 94 | 47 |
| 2008 actual | 104 | 52 |

The increase by ten trees with mistletoe in the two years to 2008 is about half the increase, by nineteeen trees, in the interval between 2002/4 and between 2004/6. In percentage terms the rate of increase from 2006/8 was 10 per cent; from 2002/4 it was 34 per cent and from 2004/6 25 per cent.

### Abundance of mistletoe growths

The spread of mistletoe has been monitored both by the number of trees with growths, and by the number of growths on each tree. Table 2 shows the number of trees seen to have one growth, two growths and so on, up to the most seen on any individual tree.

Remarkably, the number of trees with just one growth is nearly the same in each year. It is on the greater number of trees with more than one growth that the year-on-year increase depends. By 2008 there were nine trees with ten or more growths, including one with fifteen and one with seventeen growths. Consequently the total of growths in 2008 was 361, that is 112 or 45 per cent more growths that in 2006. The number of growths in 2006 was eighty-seven more than in 2004. There is evidently no slackening in the increase of mistletoe.

### Age of the youngest growth of mistletoe

The 2008 survey was the first in which this observation was made. The number of trees where the youngest growth was apparently one year old was thirty-six. The number where the youngest was apparently two years old was fifteen. These data should yield more information when repeated in subsequent surveys.

TABLE 2. Frequencies of trees recorded with 1–17 growths in each survey year.

| **Growths per tree** | **Number of trees** | | | **Number of growths** | | |
|---|---|---|---|---|---|---|
| | **2004** | **2006** | **2008** | **2004** | **2006** | **2008** |
| 1 | 46 | 47 | 46 | 46 | 47 | 46 |
| 2 | 14 | 14 | 11 | 28 | 28 | 22 |
| 3 | 4 | 12 | 13 | 12 | 36 | 39 |
| 4 | 2 | 5 | 8 | 8 | 20 | 32 |
| 5 | 1 | 4 | 7 | 5 | 20 | 35 |
| 6 | 3 | 2 | 2 | 18 | 12 | 12 |
| 7 | 2 | 4 | 3 | 14 | 28 | 21 |
| 8 | 1 | 2 | 3 | 8 | 16 | 24 |
| 9 | 0 | 2 | 2 | 0 | 18 | 18 |
| 10 | 1 | 0 | 2 | 10 | 0 | 20 |
| 11 | 0 | 1 | 2 | 0 | 11 | 22 |
| 12 | 0 | 0 | 1 | 0 | 0 | 12 |
| 13 | 1 | 1 | 2 | 13 | 13 | 26 |
| 14 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15 | 0 | 0 | 1 | 0 | 0 | 15 |
| 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17 | 0 | 0 | 1 | 0 | 0 | 17 |
| Totals | 75 | 94 | 104 | 162 | 249 | 361 |

The observation is the apparent age, that is when just one sprout or a sprout with a second division of leaves is visible. The actual time from seeding, to penetration of the bark by the seedling, to appearance of sprouting mistletoe would be about two years longer than the apparent age.

## Conclusion

The 2008 survey of the East Front Canal Avenue at Hampton Court Palace has shown that there continues to be a vigorous increase in the amount of mistletoe growing there. But this increase is much more due to the number of growths per tree than the number of trees with mistletoe. The number of host tress went up by ten between 2006 and 2008; the number of growths by 112.

Possible reasons for this are speculative. It might be that as the number of trees with mistletoe increases nearer the total of 199 trees in the avenue, the possibility for new host trees diminishes. It is also striking that some trees are well populated with mistletoe growths and produce still more growths each year. These trees would have a good source of berries to inoculate them in new places, as birds perch, feed and defecate seeds on to them. In effect, where there are growths, yet more growths can be enabled to grow.

## Acknowledgements

The author is glad to thank the Historic Royal Palaces for allowing surveying in 2008, as they did in 2004 and 2006. Particular thanks are deserved by those who joined me to make the 2008 survey, namely: Veronica Baker*, Group Secretary, and Ecology and Conservation Studies Society; Mark Bridger*, The Royal Parks; Graham Dillamore*, Historic Royal Palaces; Simon Hawkins, BTCV; Tom Hayward, Marble Hill Park; Tasha Hunter, Ecology Officer, London Borough of Richmond upon Thames; David Ivison*, Landscape Manager; Elisabeth Marris*, Ecology and Conservation Studies Society; and Francesca Morrison, London's Arcadia.

* Members of the Mistletoe Species Action Plan Group in the London Borough of Richmond upon Thames.

## Reference

MARRIS, T. 2007. Survey of mistletoe *Viscum album platyspermum* Kell. at Hampton Court Palace. *Lond. Nat.* **86**: 35–46.

# A numerical analysis of the recent spread of mistletoe *Viscum album* L. in Essex and north-east London

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## Abstract

Following a long period of a more-or-less static, scattered distribution, the hemiparasite mistletoe, *Viscum album* L., has in recent years begun an explosive colonization of new host trees in eastern England. This has been studied at two sites in Essex and one in the London Borough of Redbridge. By exploiting the fact that as mistletoe bunches are approximately spherical, and produce just one bifurcation of their dichotomous branching per year, their minimum age has been estimated from their diameters, permitting determination of their rate of growth, and by extrapolation, the approximate time of their establishment. The results suggest that these colonizations began not later than 1992–1996 and that there has been an exponential increase in numbers of bunches at all three sites since then, with a doubling time of around two years.

## Introduction

Up until the second half of the twentieth century, historical records suggest that in Essex and north-east London, apart from a few introductions on garden apples, mistletoe was a very local plant with fairly stable but isolated populations such as those on hawthorn, ash, hybrid black poplar, field maple, hazel, goat willow, hornbeam and even dog rose *Rosa canina* in Hatfield Forest (Adams 2008), on common (hybrid) limes at Hylands Park, Chelmsford, and Marks Hall, Coggeshall; on ash, common lime and hybrid black poplar at Spains Hall, Finchingfield; on oak at Merks Hill, Dunmow; on ash and elm at Braxted, and on hawthorn at Belton Hills, Leigh (Jermyn 1974). In south-west Essex, it had formerly occurred on several trees including oaks in the Woodford–Loughton area and on crab apple (Warner 1777), and on hawthorn and oak in Epping Forest until well into the twentieth century, but eventually died out on the former in the 1950s. Even in the nineteenth century Gibson (1862) only records it at fifteen localities in Essex, despite its potential ability to parasitize a wide range of species, and an abundance of apparently suitable host trees, and it has subsequently been lost from several of his sites. Similarly, in the 1990s the BSBI actually initiated a survey to establish whether the perceived decline in mistletoe nationally was a reality (Briggs 1999). In the *New Atlas of the British & Irish Flora* (2002) F. J. Rumsey (p. 424) states that 'A repeat survey in 1994–8 provided no evidence for any marked changes in its distribution'.

In recent decades however, mistletoe has begun a spectacular colonization of new sites all over England, including north-east London and Essex, not only filling in gaps in its present distribution, but extending northwards into Scotland (cf. BSBI *Atlases* 1962 and 2008) as well as increasing in bunch numbers on individual trees. In this study the fact that mistletoe bunches are approximately spherical, and produce just one bifurcation of their dichotomous branching per year, has been exploited to estimate the minimum age of bunches on recently colonized trees, and thereby determine their rate of growth, and by extrapolation, the approximate time of their establishment.

This recolonization by mistletoe raises many questions as to how and why this intensely specialized hemiparasite spreads onto new trees. It is said to be strongly dependent on two particular species of birds for dispersal of its seeds, primarily the mistle thrush *Turdus viscivorus* (defecated seeds) and the blackcap *Sylvia atricapilla* (beak-wiped seeds); and for pollination it is said to depend on cluster flies (*Dasyphora*, *Pollenia* and *Musca* species (Briggs 2003)), but Hatton (1964) provides evidence that wind pollination can play a major part. The flowers are aromatic, and in Scandinavia on mild days in March bees collect pollen from the flowers thus assisting in pollination, and probably also do so in this country (Grazi 2008). Nectar is produced in the bottom of the female flowers, and although it attracts insects, it also collects incoming pollen and when it dries out may play a role in pollination (Heide-Jørgensen 2008).

The role of mistle thrushes in seed dispersal is remarkably adapted and specialized. Mistle thrushes pair for life, and although other birds will eat mistletoe berries and can disperse the seeds, pairs of the thrushes will sit on a branch below a bunch of mistletoe for long periods, warding off other birds, thus preserving a larder for themselves throughout the winter (Snow and Snow 2008). Von Tubeuf (1923) gave an account and illustration, showing how, when the thrush defecates, having consumed numerous one-seeded berries, a long string of mucoid material falls down, and as it hits a branch, slings round and adheres to it. Numerous seeds occur in each deposit of mucoid. The mucinous material is now known to be a coacervate of pectin and short fibres of cellulose, known as viscin, that partially sets to a glue-like slime, and is derived from the flesh of the mistletoe berries. This material is the basis of the Italian version of bird lime, mixed with oil and turpentine, that is still used on the Continent to trap birds that alight on boughs coated with it, becoming stuck fast by their feet. It must therefore form a tenacious bond between the seed and the bark.

In the case of the blackcap, most of the seeds probably fail to pass through the gut, as they separate out the large sticky seeds and wipe them onto the nearest branch, only eating the flesh of the berry. There are very few species of small birds that eat berries of this size and possibly blackcaps get away with it by sneeking into the bunches in the presence of the mistle thrushes. Otherwise, if they only take berries in the absence of guardian mistle thrushes they are unlikely to make more of a contribution to dispersal than any other berry-eating birds such as blackbirds and fieldfares. In reality, since they wipe their beaks on the nearest branch immediately on plucking a berry, they may spread the parasite along existing or onto additional branches on the same tree, but are unlikely to spread the seed to another tree. Of possible relevance here is the fact that increasing numbers of blackcaps have been abandoning their summer visitor status and overwintering in southern England, thus being around when the berries are available and accessible. Titmice are partial to the seeds and may consume a considerable proportion of the crop (Grazi 2008). The local reduction in the numbers of titmice in the region in recent years may thus be a contributory factor in mistletoe success.

Dry sunny days in March and April dry the viscin on the remaining seeds, and they begin to germinate. Initially the hypocotyl emerges and swells at the apex to form an adhesion disc on the bark surface, from which a haustorial lobe develops that attempts to penetrate through to the xylem of the vascular tissue of the host, so that it can tap into the water and mineral supply. At this stage, although the seedling is only five millimetres long, it then embarks on a period of dormancy until the following spring, when it may produce its first pair of tiny leaves from the other end of the seed, although this can be delayed for up to four years depending on the weather. There may be more than one embryo per seed, so two plants can actually grow from one seed. The haustorial system grows along the branches of the host within the cortical tissue and buds off sinker haustoria at intervals, that grow inwards and tap the host xylem. Blossoms do not appear until the plants are five to six years old. The fruit is a berry with a single seed, and the fruit wall has three layers. The outer white layer is leathery and is discarded by birds, while the middle layer consist of two types of viscin-producing cells, those responsible for the sticky component and the others for the elastic component. These break down to release the viscin mucilage. A third thin, inner layer adheres strongly to the seed and to the viscin mucilage.

*Viscum album* is dioecious, and a crop of berries produces approximately equal numbers of male and female plants, thus, depending on infection success, a given host may bear both male and female mistletoe bunches. An added complication is that once established, mistletoe spreads along under the bark of the host, usually towards the distal end of a branch, erupting at intervals to produce aerial bunches, and thus giving rise to successively smaller bunches along a branch. The term 'bunch' is therefore used in this study rather than 'plant' as an individual plant may encompass several interlinked aerial bunches.

## Methods

In this study, three apparently recently established populations of mistletoe were selected at sites that were likely to have been undisturbed by tree felling, mistletoe cutting or new building work during the development of the mistletoe bunches. These were at Woodhouse Lane, Little Waltham (TL707115) where the hosts are common (hybrid) lime *Tilia* × *vulgaris*; at Theydon Bois golf course (TQ447998) where the hosts are hybrid black poplars *Populus* × *canadensis* and grey poplar *Populus* × *canescens*, both in Essex; and Redbridge Recreation Ground (TQ419893), where the hosts are *Populus* × *canadensis* and western balsam poplar *Populus trichocarpa*, in the London Borough of Redbridge. The common limes at Little Waltham are long established, but the poplars at Redbridge and Theydon Bois are no more than forty years old. At Redbridge there were three younger trees along a line of fifty that had been replaced where the original trees had died. In all three cases these new populations have almost certainly been initiated from former mistletoe colonies in adjacent garden apple orchards. At Redbridge an old apple orchard at the north-western end of the site was grubbed prior to the development of an adjacent housing estate; at Theydon, mistletoe grew on apple nearby at Wansfell (Jermyn 1974), and at Little Waltham it grew on a garden apple tree in the 1950s (Adams 2008), very near the now abundant common lime colony.

At all three sites the mistletoe bunches were located, and their diameters determined remotely, using a theodolite with a millimetre scale in the focal plane, and knowing the horizontal distance of the theodolite from the tree. The millimetre scale was calibrated using concentric circles ranging from 10 to 50 cm, at 10 cm intervals, on a screen viewed from points ranging from 4 to 30 m distant in 2 m steps.

The dynamics of mistletoe growth are complex and need explaining in detail. Branching is dichotomous, and once fully established a new pair of internodes is produced per growing branch annually. If these branches were always the same length, since the bunches are approximately spherical in form, it would in theory be possible to work out the age of a bunch from its projected diameter. The first five new internodes are indeed, initially, remarkably constant in length (*c.*5–6 cm), but branches in succeeding years are slightly longer. However, continued growth of the younger branches in successive years compensates for the initial differences in the age groups, so that bunches up to a minimum of eight years old are effectively their own chronometers. Bunch diameters were recorded numerically up to a diameter of 100 cm, anything larger simply being recorded as >100 cm, as by this stage the relationship between age and diameter begins to break down. Over a period of twenty years or so bunches can grow to a diameter of up to two metres. It must however, be borne in mind that it may take several years for an established seedling to produce its first pair of nodes, thus the estimated dates for initial establishment in this study are latest likely dates.

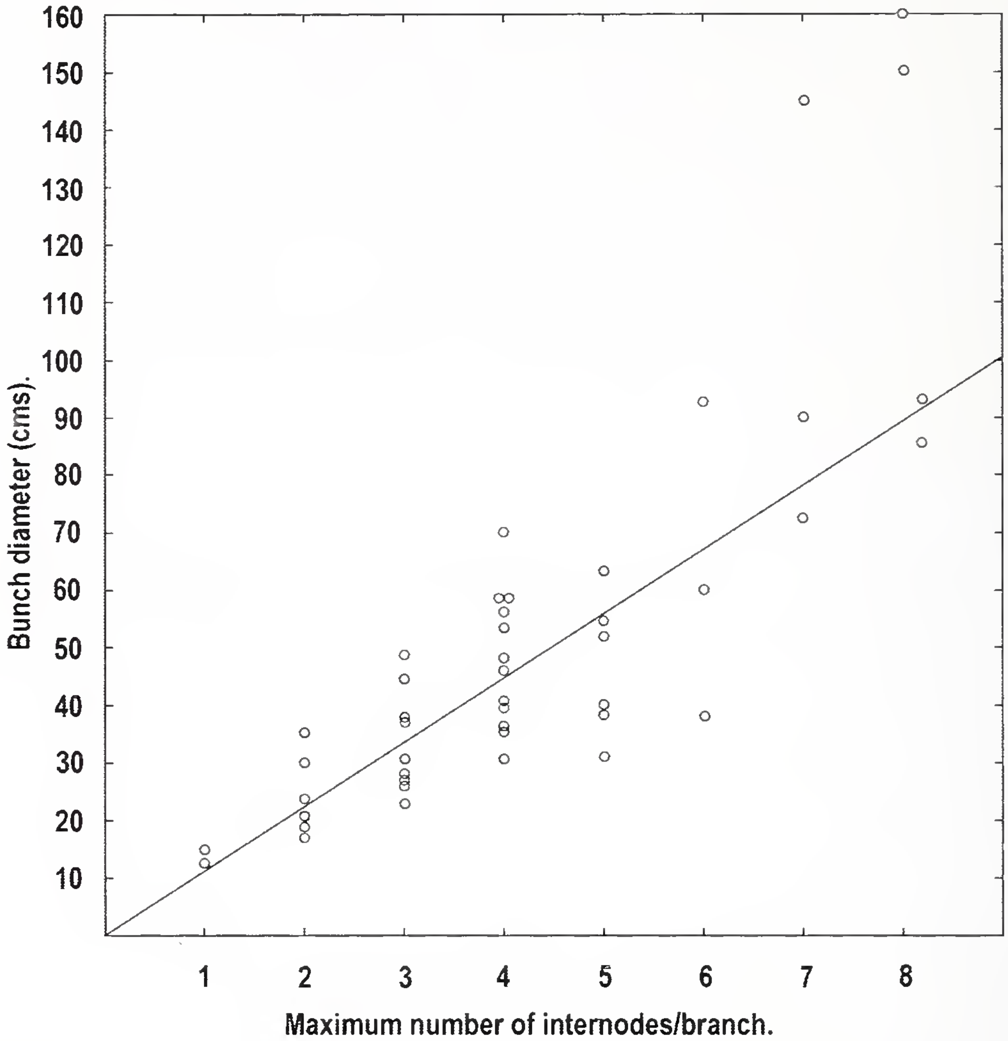

FIGURE 1. Diameters of 38 calliper-measured accessible bunches plotted against the mean number of internodes per pair of branches sampled per bunch. Note the linear trend in the relationship out to an internode number of between 7 and 8.

To establish this complex relationship, the bunch-diameters (mean of two measurements at right angles) of thirty-eight accessible bunches of mistletoe were measured using callipers and the corresponding number of internodes counted per branch. The resultant data are plotted graphically as Figure 1. This analysis established that on average bunches increase in radius by 5.6 cm annually, ranging from 5.96 for the first internode, and 5.56 for the sum of internodes one to eight. Although there is a considerable spread around the line linking zero to the expected diameter of an average nine-internode branch (two branches measured per bunch), due to the small size of the sample of accessible bunches available, it does however show that the trend is inherently linear out to a branch internode number of between 7 and 8.

Using this overall mean value, the estimated time sequence of increase in diameter was plotted for 130 bunches measured by theodolite (Figure 2). The gain in diameter per estimated minimum age in years is presented in Table 1 for the three colonies studied.

Making the assumption that the recent population increase results from release from some inhibiting factor, and that the increase might therefore be expected to be exponential, the data are plotted in Figure 2 as the number of mistletoe bunches on an exponential scale against their estimated age on a linear scale, the latter being obtained by dividing their diameters (cm) by 2 × 5.6 cm, the mean increment in diameter per year. The values as plotted are listed in Table 2.

TABLE 1. Gains in mean bunch diameter per minimum estimated age for the range of bunch diameters over which the relationship between internode length and bunch diameter is inherently linear, for the three mistletoe colonies studied.

| **Site** | **Bunch diameters (cms)** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | >90 | 90 | 80 | 70 | 60 | 50 | 40 | 30 | 20 |
| | **Minimum estimated age of bunch (yrs) = mean diameter/11.2 cm** | | | | | | | | |
| | | 8.0 | 7.1 | 6.3 | 5.4 | 4.5 | 3.6 | 2.7 | 1.8 |
| | | **Gain in mean bunch diameter per estimated year** | | | | | | | |
| Little Waltham | 4 bunches | 1.40 | 1.23 | 1.06 | 1.18 | 1.08 | 1.00 | 1.05 | 1.04 |
| Redbridge | 6 bunches | 2.50 | 1.40 | 1.14 | 1.38 | 1.73 | 1.05 | 1.10 | 1.27 |
| Theydon Bois | 8 bunches | 1.25 | 2.2 | 1.32 | 1.24 | 1.08 | 1.18 | 1.02 | 1.16 |

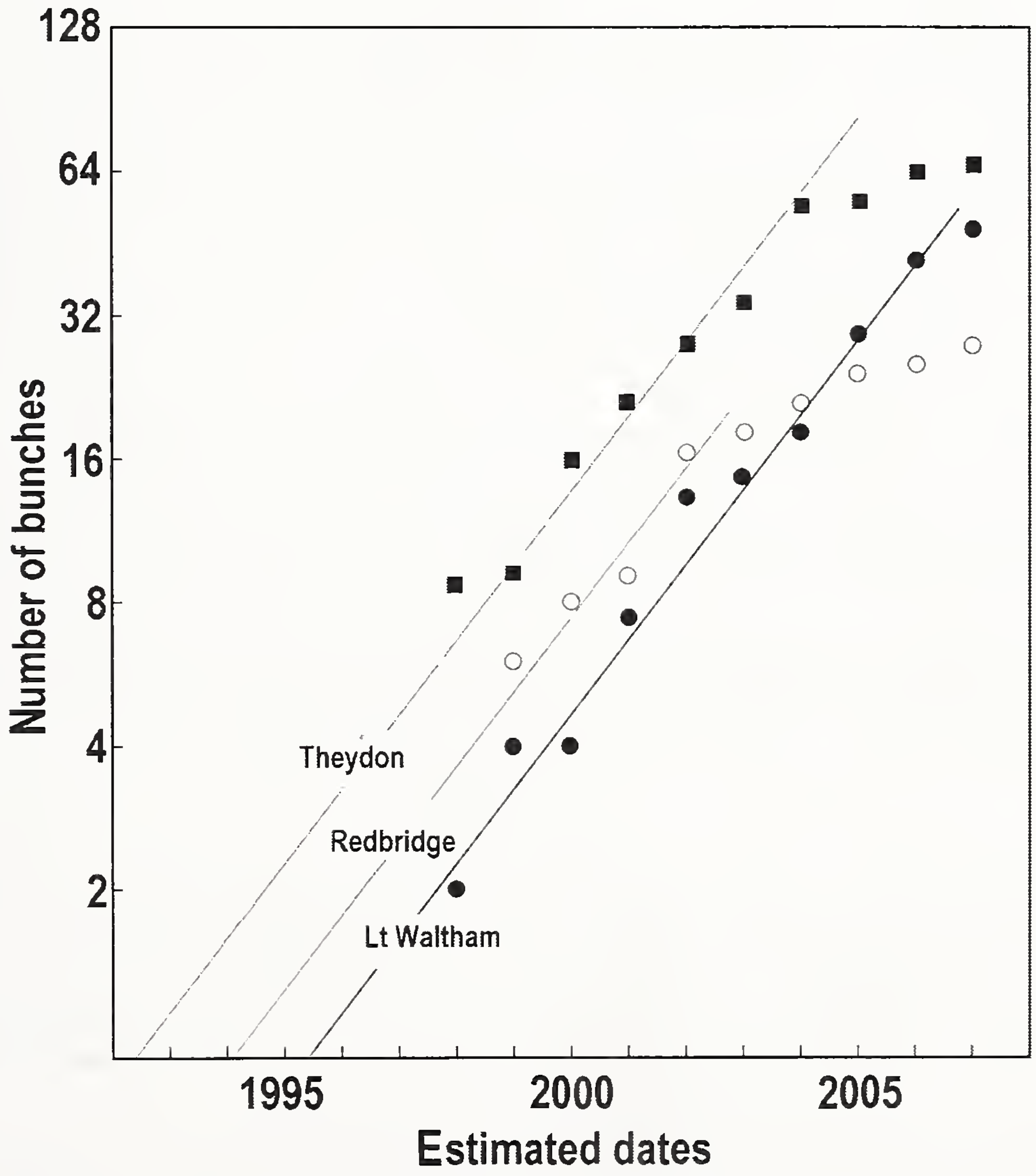

FIGURE 2. Number of bunches at the three sites against estimated minimum age, plotted on a log-linear scale, to reveal the exponential relationship. The regression line fitted to the Little Waltham data has been superimposed on the other two less-complete data sets to estimate the approximate dates of initial colonization.

TABLE 2. Cumulative numbers of mistletoe bunches for successive year equivalents at the three study sites assuming a mean diameter gain of 11.2 cm per year.

| Minimum estimated age (yrs) as equivalent dates | Little Waltham, Woodhouse Lane | Redbridge recreation ground | Theydon Bois golf course |
|---|---|---|---|
| 1998 | 2 | – | 10 |
| 1999 | 4 | 6 | 11 |
| 2000 | 4 | 8 | 18 |
| 2001 | 7 | 9 | 21 |
| 2002 | 13 | 17 | 28 |
| 2003 | 15 | 20 | 35 |
| 2004 | 21 | 21 | 47 |
| 2005 | 29 | 23 | 49 |
| 2006 | 43 | 26 | 56 |
| 2007 | 47 | 28 | 57 |

## Results

As can be seen for the plots of the data for the Theydon and Little Waltham sites (Figure 2), the relationship is clearly log-linear for the range of estimated dates 1998 to 2005. The doubling-time for the regression line for the Little Waltham data, which fits most clearly to the log-linear relationship, is around two years. Drawing lines of the same slope through the other two sets of data, and extrapolating backwards in time, suggests dates for the initial establishment of each of the colonies as 1991–2 (Theydon), 1994 (Redbridge) and 1995–6 (Little Waltham). These however, are not necessarily the dates at which the expansion was initiated at the three sites. As in the case of the Little Waltham and Redbridge sites, where numerous trees of several other species are involved in addition to the trees studied. A special analysis of these forming the basis of a separate study will be reported later. It is of interest to note that in a simultaneous but independent study, it has been established that colonization of hybrid limes at Hampton Court is likely to have been initiated around 1996 (Marris 2007). It must be remembered however, that the tiny initial germlings can lie dormant for up to four years before producing their first pair of leaves, so these dates could in some cases be much later than the initial infection dates. The graph also shows a mysterious fall-off in the growth rate at two of the three sites in the last three to five years.

## Discussion

As first shown by von Tubeuf (1923), the berries pass through the alimentary canal of mistle thrushes in as short a period as eighteen minutes, so they are unlikely to spread the seed very far from the feeding site in any one season. This would account for the clusters of new colonies in the vicinity of the assumed apple orchard sources (as blackcaps deposit the seeds in situ, they will not spread it from tree to tree). The distribution of new colonies on a range of hosts around Redbridge Recreation ground, Theydon Bois golf course and Little Waltham village, and an additional site at Woodford Green, reveals clusters no more than one kilometre in radius, more or less within the normal foraging range of mistle thrushes. Of probable relevance here is that it has been shown that mistle thrushes are now largely absent from the countryside and have their main strongholds in residential areas (Mason 2000).

Although it can take a minimum of three years (more usually four to five) from initial establishment for a female mistletoe to produce berries, large numbers can thereafter be produced each year. One might expect therefore, that after a three-year initial lull, large numbers of new bunches would suddenly appear as a result of multiple successes. Furthermore, once established, both male and female plants can grow along under the bark and erupt additional bunches, thus adding further to bunch numbers. A doubling time of two years suggests however a very low success rate for seed establishment with, bearing in mind additional bunches from vegetative spread, somewhat less than one berry on average establishing a new plant from all those produced by each female plant per year. Of possible significance however, is the apparent gradual increase in the doubling time seen in the recent trends for the Theydon, and even more so in the Redbridge data, which are approaching a value of ten years for the period 2004–2007. Since this is unlikely to be due to the parasite running out of suitable hosts, it must either reflect problems with pollination, seed dispersal, or possibly some reassertion of the very limiting factor that was lifted when the explosive colonization began. Although it has been assumed that the rate of growth of the internodes has been constant over the period at which the dates have been estimated, the incremental increase in internode-length on this basis does not show any fall-off with bunch diameter (Figure 1 and Table 1), thus it would appear that the rate of growth is not being affected. Data for mistle thrush prevalence (Eaton et al. 2004) show that the mistle thrush has been in progressive decline in the area of study since 1999, and in Greater London since 1998. On the other hand, the blackcap has been overwintering in the area increasingly, with remarkable peaks in 1999 and 2004 (Eaton 2007, pers. comm.).

The rapid infilling of the gaps between a more or less static, if not declining, scattered, population, over the last two decades, in combination with an equally rapid extension towards Scotland (BSBI 2008), strongly suggests that the explosion is a response to climatic change, probably an increase in average temperature, rather than any change in the effectiveness of bird-mediated transmission. Commercial mistletoe growers Clyde Valley Orchards (2008), say that it can take as long as five years for the first berries to appear on established female plants grown on apple, and note that the decline in mistle thrushes has necessitated artificial propagation. Despite a similar decline in mistle thrushes in this area there must still be enough of them around to supply seed for the expansion. Although blackcaps are on the increase, as argued above, they are only likely to spread seed on the same trees as they feed. There has also been a decline in blue tit and great tit numbers in south-west Essex and London, so perhaps a decline in seed predation could have played a part. Clyde Valley Orchards further state, however, that mistletoe establishment is dependent on a wet spring, otherwise germination is suppressed — and we have certainly had more of those in the last few decades, so maybe this has been the trigger to recent expansion. A further possibility is that as the young seedlings lie dormant and exposed over a long period, acid rain may previously have proved lethal, and the recent rapid expansion could be due to a spectacular decrease in the acidity of rain in the local region and elsewhere. Whether or not the observed apparent slow down in colonization post 2004 is also due to a subtle climatic change, or to a decrease in mistle thrushes, is unclear, and is likely to remain so until several further years of data are to hand.

## Acknowledgements

I am grateful for information and discussion to Drs Peter Brandham, Colin Selby and Jonathan Briggs, and for data from the thrush and blackcap surveys to Dr Mark Eaton of the RSPB and Dr Greg Conway of the BTO. Dr Ken Adams has assisted greatly with the drafting of this paper and the analysis of the results, as well as supplying much of the information on the biology and changes in distribution of mistletoe.

## References

ADAMS, K. J. 2008. *3rd Flora of Essex database* (unpublished).

BRIGGS, J. 1999. *Kissing goodbye to mistletoe? The results of a national survey aimed at discovering whether mistletoe in Britain is in decline.* Plantlife and BSBI.

BRIGGS, J. 2003. Christmas curiosity or medical marvel? A seasonal review of mistletoe. *Biologist* **50** (6): 249–252.

BSBI ATLAS. 1962 and 1976. *Atlas of the British flora.* Ed. Perring, F. H. and Walters, S. M. BSBI. EP publishing.

BSBI ATLAS. 2008. *Viscum album.* http://www.bsbi.org.uk/html/atlas.html

CLYDE VALLEY ORCHARDS. 2008. *Mistletoe.* http://www.clydevalleyorchards.co.uk

EATON, M. et al. 2004. *The state of the UK's birds.* Trends in widespread and common birds. Table pp. 12–13. RSPB, Sandy.

GIBSON, G. S. 1862. *Gibson's Flora of Essex.* William Pamplin. London.

GRAZI, G. 2008. *Mistletoe — introducing an unusual plant.* http://lift-fitness.com/ARTICLES/HEALTH_MISTLETOE.html

HATTON, R. H. S. 1964. Pollination of mistletoe (*Viscum album* L.). *Proc. Linn. Soc. Lond.* **176** (1): 67–76.

HEIDE-JØRGENSEN, H. S. 2008. *About Viscum – a mistletoe.* http://www.viscum.dk/eng-sider/about_viscum.htm

JERMYN, S.T. 1974. *Flora of Essex.* Essex Naturalists' Trust, Fingringhoe.

MARRIS, T. 2007. Survey of mistletoe *Viscum album platyspermum* Kell. at Hampton Court Palace. *Lond. Nat.* **86**: 35–46.

MASON, C. F. 2000. Thrushes now largely restricted to the built environment in eastern England. *Diversity & Distributions.* **6**(4): 189–194.

SNOW, D. K. and SNOW, D. W. 2008. Long-term defense of fruit by mistle thrushes *Turdus viscivorus. Ibis.* **126**(1): 39–49.

TUBEUF, C. F. von. 1923. *Monographie der Mistel.* Munchen, Berlin.

WARNER, R. 1777. *Plantae Woodfordiensis.* London.

# Coriander colony by the Round Pond, Kensingston Gardens

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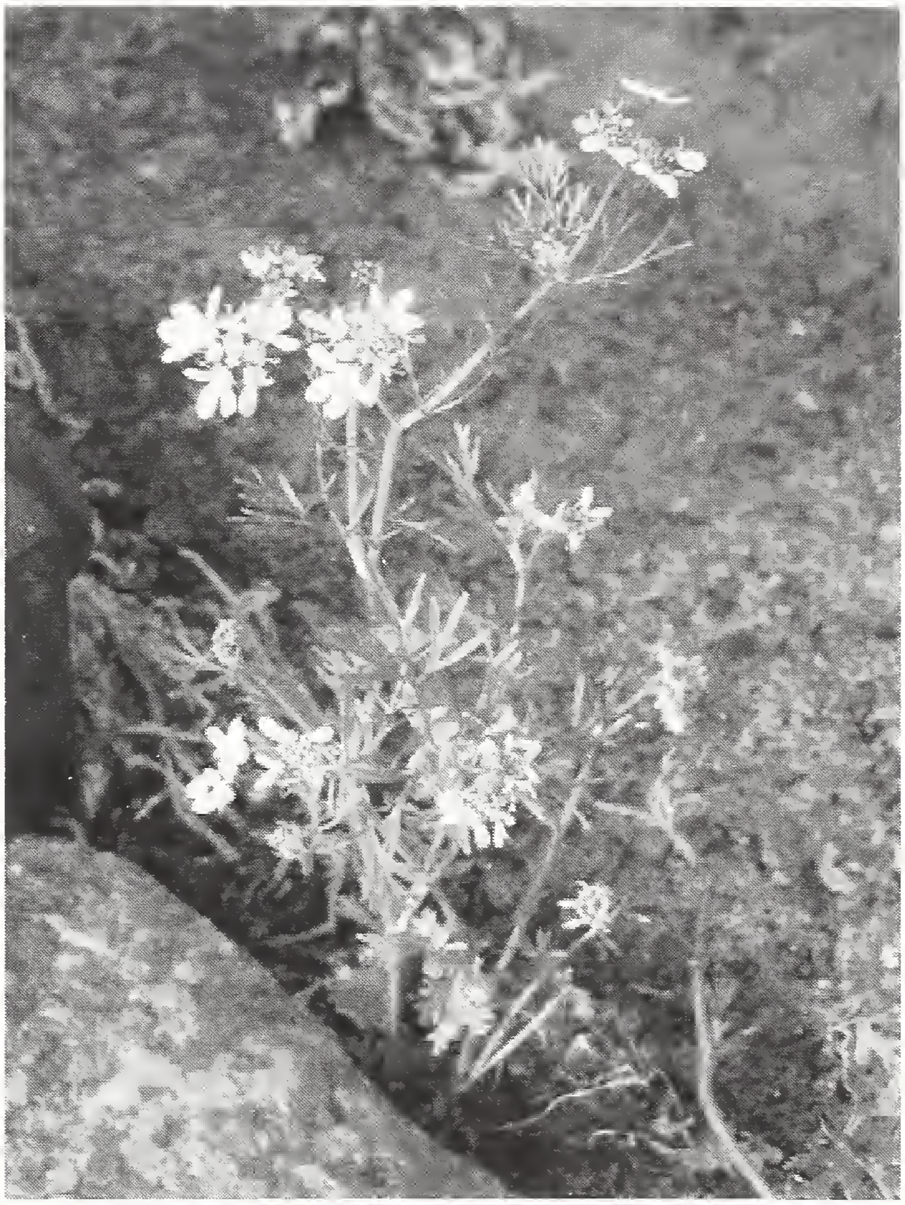

In early June 2007 a colony of unfamiliar pinkish-flowered plants appeared in Kensington Gardens along a few metres of the eastern edge of the Round Pond. About a dozen had secured footholds in crevices between the granite blocks edging the pond and flourished for a couple of weeks. Indentification of these was at first perplexing, as the plants very closely resemble *Tordylium apulum* Mediterranean hartwort, familiar to visitors to southern Europe but so far not known to occur naturally in Britain.

The Round Pond plants were finally confirmed by Eric Clement as the culinary herb *Coriandrum sativum* coriander. This is normally a warm-climate plant, but which also grows readily in Britain and is cultivated by communities associated with southern Europe and the Middle East. However, a naturally occurring colony at such a distinctive central London site is noteworthy. The nearest specimens currently on record were found in Camden Town by Aaron Woods in 2003.

A clue to the origins of the Round Pond colony is indicated by the neighbouring seat, a favourite resting-place for strollers and bird-feeders. Apparently coriander seed had been scattered at the water's edge during previous weeks, and germinated in secluded crevices. Normally, birds, in particular starlings *Sturnus vulgaris,* scavenge the margins of the pond very thoroughly, but coriander seeds are spicy-flavoured and may have been found unappetizing.

The grid reference for this site is TQ262801.

## Acknowledgements

I am grateful to Eric Clement for identifying these plants, to Rodney Burton for particulars of Inner London records, and to Nigel Reeve for providing the grid reference.

# Book reviews

***Sedges of the British Isles.*** A. C. Jermy, D. A. Simpson, M. J. Y. Foley and M. S. Porter. (BSBI Handbook No.1, Ed. 3). Botanical Society of the British Isles, London. 2007. 554 pp. Priced variously: contact Summerfield Books on 01768 484909.

The first edition of this book was published in 1968 and reviewed in this journal the following year by E.C. Wallace, who had many well-informed comments to make. The second edition, 1982, was expanded by the inclusion of maps and by putting onto separate pages drawings of pairs of species which had previously been crammed into one, but it was still a really compact little booklet. Twenty-five years later, here is the third edition with a larger page size and twice the number of pages, making it too big to fit neatly in the hand as the series title might lead one to expect. The extra bulk is needed for a full treatment of the many hybrids among the true sedges *Carex*, and for all the rest of the sedge family, many of which are of very different appearance from any *Carex*.

A comparison of the treatment of species between editions is instructive. Whilst some of the texts and drawings are unchanged between the second and third editions, others have been emended. For instance, the female glume of *Carex otrubae*, which before had a long awn in the drawing, not supported by the text, now has a much shorter one; it may well be that both states fall within the range of variation of the species, possibly even at times on different parts of the same plant, so the moral is that one should never make an identification on the basis of an illustration alone.

Its authors might have hoped, that with the inclusion of *Carex salina*, discovered in Scotland in 2004, and a recent reappraisal of the *Eleocharis palustris* group, this new edition might not date too rapidly. It's a pity, then, that only a few months after its publication, Ana Molina and colleagues from the University of León in Spain published in *Botanical Journal of the Linnean Society* **156**: 385–409 (2008) the description of a new species, *C. nordica*, distinguished from *C. divulsa* by the serrulate winged margins of the beak continuing well down the body of the utricle and other characters, and distributed from Sweden to Great Britain, with specimens cited from Miller's Dale in Derbyshire and Caldey Island in Pembrokeshire. Perhaps a fourth edition of *Sedges of the British Isles* will follow soon.

RODNEY M. BURTON

***Wild about London's parks.*** Simon W. Rees. 2008. Discovery Walking Guides Ltd, 10 Tennyson Close, Northampton NN5 7HJ. 55 pp., softback, £4.99. ISBN 978 1 904946 45 8. Also available on www.wildsideguides.co.uk/london

This unusual little book contains a series of fun and fascinating guided walks for children and families to explore London's green spaces. It turns a walk in the park into a fun adventure of wildlife discovery. The walks are designed specifically for children to lead their family; for the child to become the guide. There are clear, child-friendly maps and step-by-step directions.

The emphasis is on discovering the wildlife in the parks. There are questions throughout each walk that encourage the children and the rest of the family to discover the birds, animals and plants in the park. The book contains a set of Wildlife Identification Guides that are used on the walks, in order to answer the questions and to help identify other animals and plants. There are Wildlife Identification Guides to trees, wildflowers, birds, butterflies, minibeasts (bugs and creepy-crawlies), ponds and streams and freshwater fish. Besides this, interesting historical facts and puzzles are also included.

In total, the book consists of six different walks set in the following areas of London: Hampstead Heath, Regent's Park, Hyde Park, Kew Gardens, Richmond Park, and along the Thames at Ham. As well as the six walks there are also shorter reviews of other interesting wild places to discover in London, e.g. Coram's Fields, the Wetland Centre and Battersea Park.

K. H. HYATT

# Floral changes in the Ruislip Woods National Nature Reserve, 1976 – 2005

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## Summary

During 2003–2005 the flora of the Ruislip Woods National Nature Reserve was resurveyed for comparison with a previous survey completed in 1976. A total of about 490 species was recorded for both surveys. Thirty-six species of garden origin were found compared with only four species thirty years previous. Five species had increased significantly. A number of species characteristic of open, waste ground had decreased, six significantly. This was unexpected since coppicing had been restarted in 1982. Five species more characteristic of woodlands had increased significantly. None of the species discussed is rare but the results are an indication of subtle ecological changes that have occurred in thirty years.

## Introduction

From 1946 to 1976, F. E. Wrighton, a local botanist, but better known to the London Natural History Society for his work on the London bomb sites (Wrighton 1953), surveyed the flora of the Ruislip Woods (Wrighton 1979). These consist of Park Wood, Copse Wood, Mad Bess Wood and Bayhurst Wood, comprising a total of 219 hectares (548 acres). The history of the woods is well documented (Bowlt and Bowlt 1982). Their associated earthworks, composition of hornbeam coppice with oak standards, and typical 'indicator species' such as wild service tree *Sorbus torminalis* indicate that they are ancient woodlands. Park Wood is particularly interesting in containing the northern section of the Saxon 'park for wild beasts' referred to in the Domesday entry for Ruislip, the outline of which is still delineated by the remains of the massive bank and ditch. Other tree/shrub species include birch *Betula pendula* and *B. pubescens*, ash *Fraxinus excelsior*, beech *Fagus sylvaticus*, aspen *Populus tremula*, hazel *Corylus avellana*, guelder-rose *Viburnum opulus*, cherry *Prunus avium*, field maple *Acer campestre* and Midland thorn *Crataegus laevigata*. In both Copse Wood and Mad Bess Wood a block of woodland was cleared in the mid nineteenth century but they have subsequently reverted to woodland.

Following a public outcry in 1978 about the lack of management of the woods, coppicing was restarted in 1982 after a lapse of some forty-five years (Hawksworth 1983). Since then the woods have been managed according to a Ruislip Woods Long-term Management Plan (London Borough of Hillingdon 1982).

During 2003–5 a resurvey of the flowering plants was carried out to assess any changes that had taken place during the previous thirty years. The preliminary results of this are presented here.

## The Wrighton survey, 1946–1976

For recording purposes Wrighton divided up the woodlands into fifteen approximately equal areas of 21 hectares (50 acres), identifiable on the ground by well-established footpaths (Figures 1 and 2). He recorded the flowering plant species in each of these compartments on a present/absent basis. This gave a rough indication of the distribution of each species, but provided no indication of abundance (presence in a compartment could mean a single specimen or many).

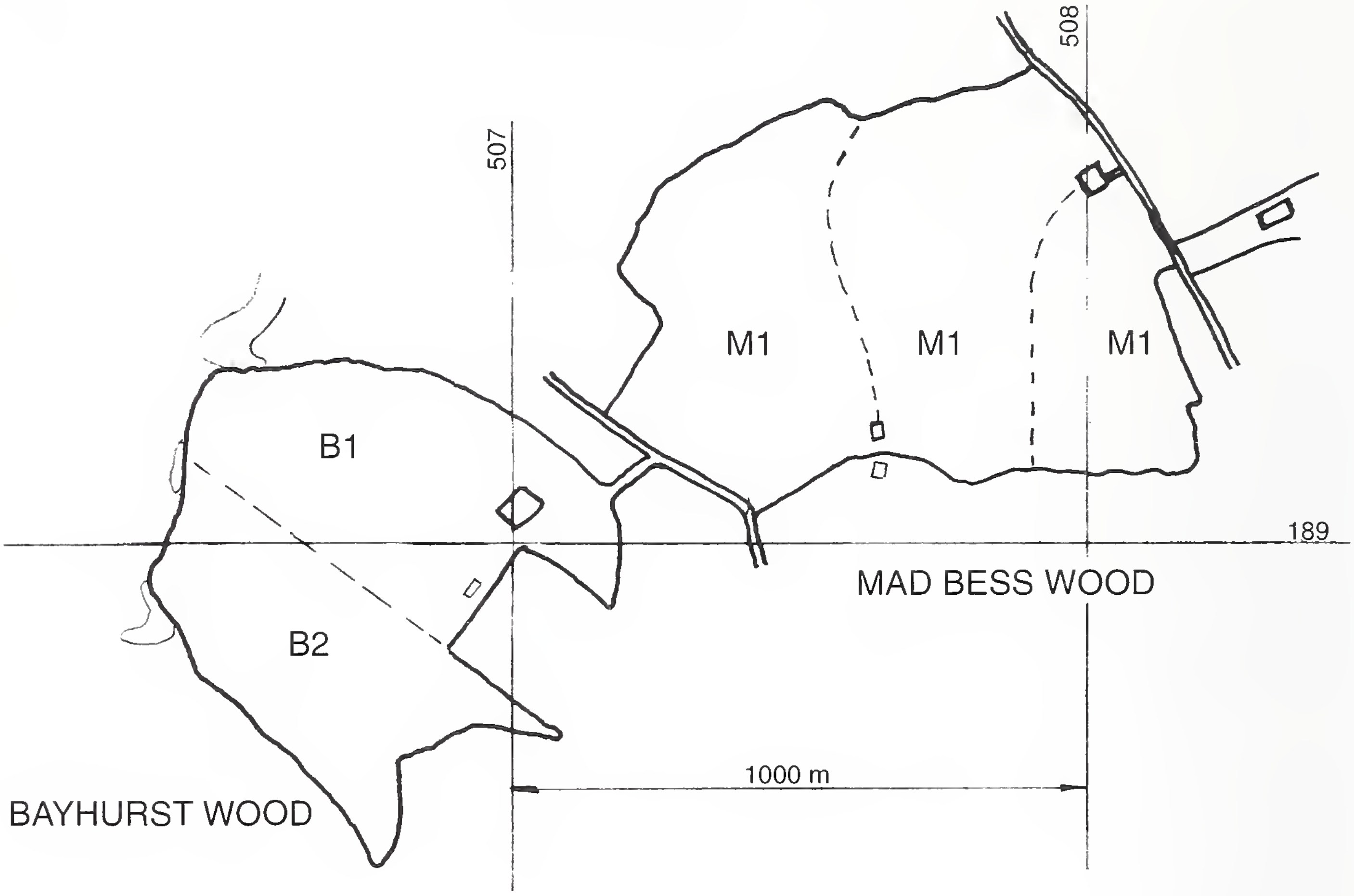

FIGURE 1. The Wrighton compartments in Bayhurst and Mad Bess Woods.

## The resurvey, 2003–2005

A team of recorders resurveyed the Wrighton compartments, which were still clearly identifiable. The recorders were of varying botanical abilities and some 'difficult' species remain still to be dealt with. However, apart from these it is considered that most of the species were correctly identified. Wrighton (1979) stated, 'As with all vegetation surveys, 100% accuracy cannot be claimed', and a few locally rare species may have been missed. To achieve a strict comparison with the Wrighton survey and also to keep the work manageable with the limited number of recorders and time available (Wrighton recorded over the period 1946–1976), species were only recorded on a present/absent basis in each compartment with no attempt to assess abundance. Herbarium specimens are being collected of all species recorded during the resurvey and the herbarium is about 70 per cent completed (2007). It is anticipated that it will be of use in any future reassessments of the current flora. An example is a small patch of tor grass in Copse Wood, an unusual species in Middlesex but first recorded here in 1892 (Kent 1975). This now turns out to be *Brachypodium pinnatum* in its strict sense, to be distinguished from the downland plant which is now identified as *B. rupestre* (Burton 2001). Without herbarium material written records of such species will be in doubt.

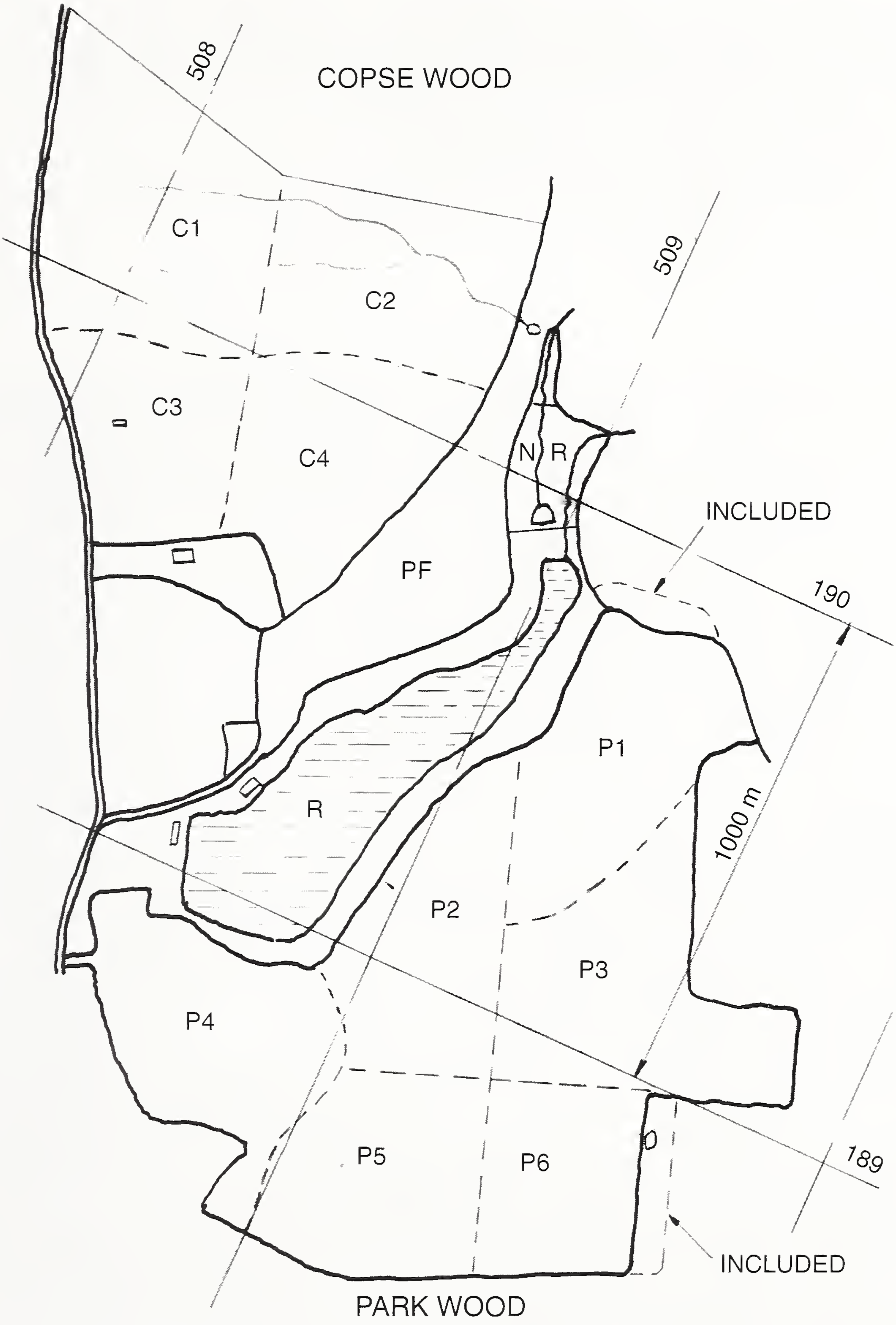

FIGURE 2. The Wrighton compartments in Copse and Park Woods.

## Results

A total of about 490 species was recorded from both surveys. Although the resurvey has yet to be fully completed a comparison of the two surveys some thirty years apart indicates some clear changes which are unlikely to be altered by further recording. Changes are here estimated by the percentage change in numbers of compartments in which a species is present out of the total of the fifteen Wrighton recording compartments.

### (a) Invasive species of garden origin

Thirty-six species of garden origin were recorded, but most in only four or less of the compartments. Only four of these species were recorded thirty years ago. Five species had increased significantly ( >40%):

*Aesculus hippocastanum* horse chestnut +40%.
*Hyacinthoides hispanica* Spanish bluebell +40%. Notably behind gardens as a throw-out, or planted at entrances.
*Narcissus nom.* daffodil +47%. Usually deliberately planted.
*Prunus laurocerasus* cherry laurel +73%.
*Taxus baccata* yew +40%. Bird sown.

Although holly *Ilex aquifolium* was present in all compartments in both surveys the number of seedling and young trees now scattered throughout the woods indicates that, as for yews, birds must be a major factor in seed dispersal from gardens.

### (b) Species characteristic of open areas

A number of species more characteristic of waste, open ground have decreased, six significantly:

*Aegopodium podagraria* ground elder -47%.
*Artemesia vulgaris* mugwort -93%.
*Bellis perennis* daisy -67%.
*Capsella bursa-pastoris* shepherd's purse -60%.
*Plantago lanceolata* ribwort plantain -47%.
*Tussilago farfara* coltsfoot -93%. After none being recorded during the first year of the survey a careful search was made in the second year when only a single small clump was found in Mad Bess Wood.

But only *Sochus asper* spiny sow-thistle increased +47%.

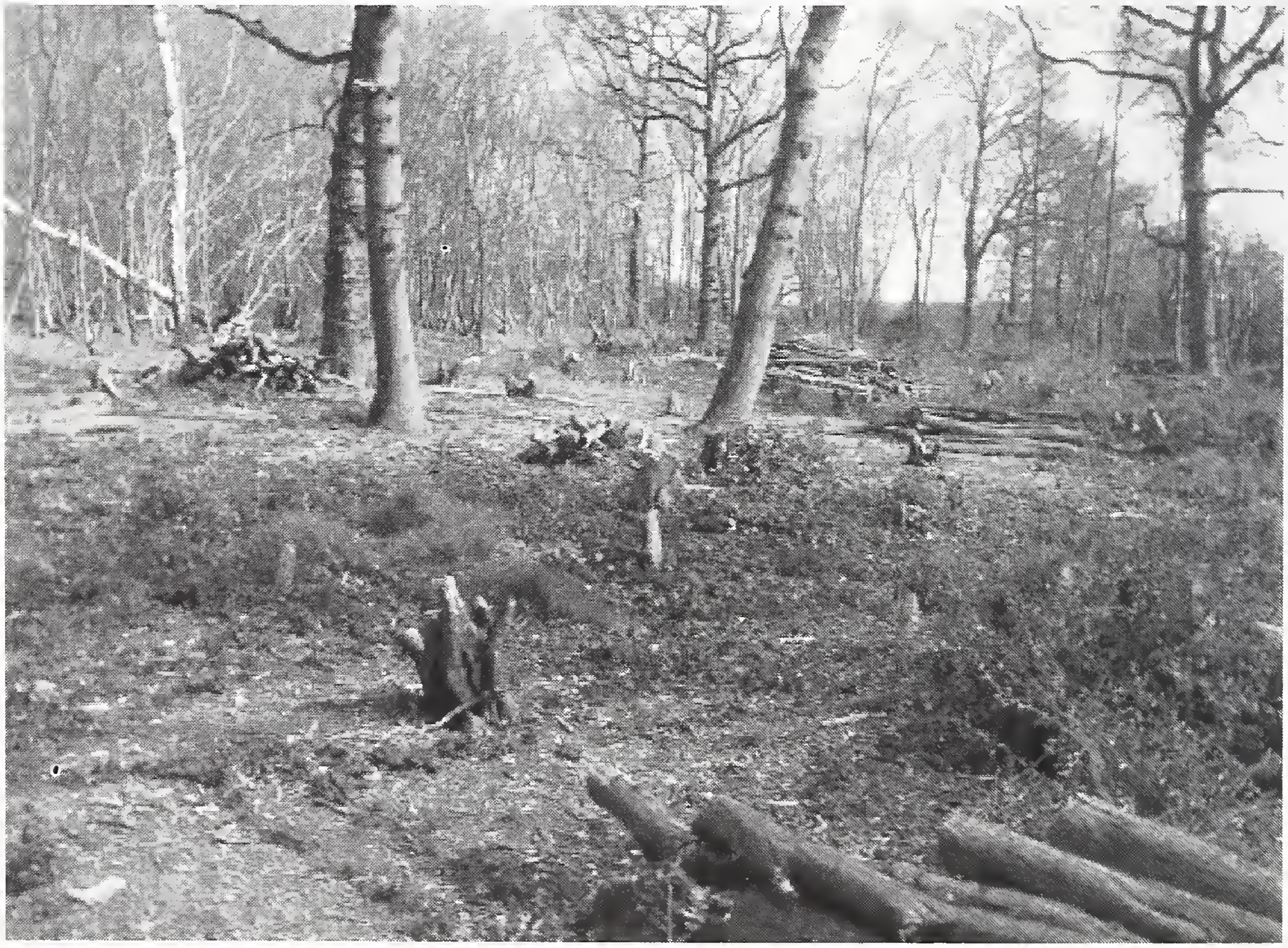

FIGURE 3. Area in M1, coppiced 2006/7, photgraphed April 2008. Still largely bare areas towards uncut coppice. Cut wood now left lying to rot.

Taken together, the decreases of these species strongly suggest that there has been a decrease, at least in some parts of the woodlands, in the amount of light reaching the ground (i.e. fewer open areas). This is a surprising result since coppicing was reinstated *c.*1980 after a lapse of many years (Figure 3). It suggests that the increased light reaching the ground after coppicing was not in itself sufficient to encourage these wasteland species to re-establish themselves.

However, of four species characteristic of open, but *grassy* places, two decreased and two increased significantly between the two surveys:

*Hypochaeris radicata* cat's-ear -73%.
*Rumex acetosella* sheep's sorrel -87%.
*Cirsium vulgare* spear thistle +60%.
*Senecio jacobaea* common ragwort +53%.

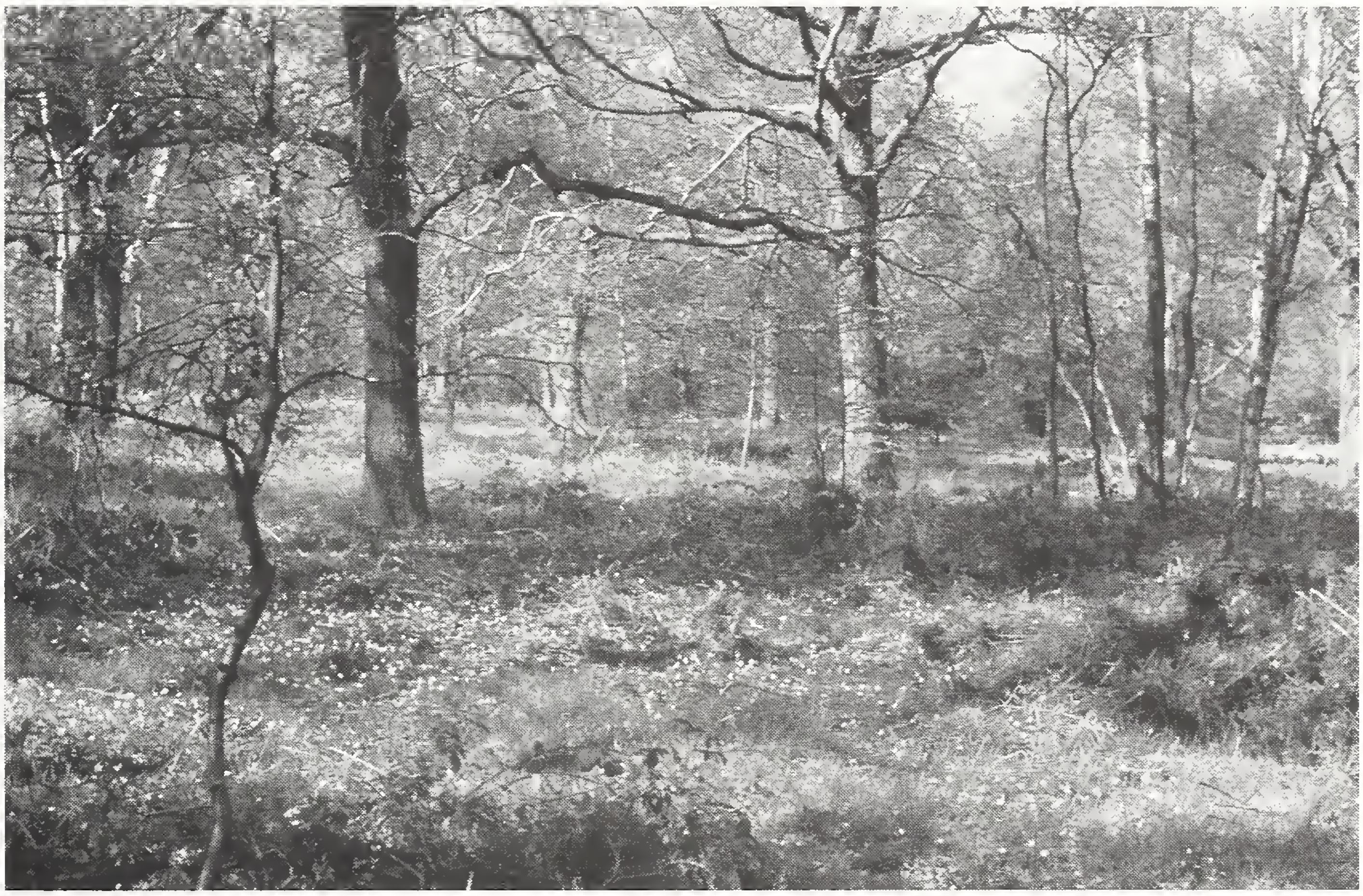

FIGURE 4. Area in P5 without coppice, photographed April 1981. Wood anemones plentiful here in spring, with bramble, bracken dominant later. Ground flora changes much less rapidly compared with coppice areas.

**(c) Species more chacteristic of woodland** (Figure 4)

Two showed significant decreases, but five significant increases:

*Digitalis purpurea* foxglove -40%.
*Viburnum opulus* guelder-rose -40%.

*Callitriche stagnalis* mud water starwort +60%.
*Circaea lutetiana* enchanter's nightshade +40%.
*Geranium robertianum* herb Robert +67%.
*Persicaria hydropiper* water pepper +53%.
*Rumex sanguineus* red-veined dock +60%.

Of the nine species of speedwells *Veronica* recorded, all showed increases, with *V. agrestis, arvensis, beccabunga, montana* and *persica* new since 1976. With only their genus in common it is difficult to account for this. Wrighton did not record *V. montana* in any part of the woods in 1976 whereas it now occurs in seven of the fifteen compartments. The survey for the *Flora of the London Area* (Burton 1983) carried out from 1965 to 1976 recorded it in all the tetrads covering the Ruislip Woods. The complete omission by Wrighton (a very competent botanist) of this species must be assumed a mistake.

## Discussion

### (a) Distribution of increases and decreases in the woods

The original recording method adopted by Wrighton and continued in the repeat survey is too coarse to determine whether changes are concentrated around the edges of the woods close to habitation as reported for urban woods of Sheffield (Gilbert and Bevan 1997). In the Ruislip surveys, each of the compartments extends from the edge of the woods to the centre. However, only some compartments are close to gardens, namely P4, 5,6 and C1 and 2 in Figure 2. The results fail to show that garden escapes are more common in these compartments. Gilbert and Bevan (1997) noted that non-native species rarely penetrated farther than forty metres into a wood away from garden activity. This does not seem to be so at Ruislip. A clear case is that of yew. It is now widespread at considerable distances from gardens, with seedlings and young trees to around five metres in eleven compartments compared with only four in 1976. It is assumed that the large seeds are transported by birds feeding in gardens but roosting in the woods.

Ann Rix (pers. comm.) during recording in Bayhurst Wood, which is completely surrounded by fields, noted that 'approximately 70 per cent seen in compartment B1 were found in the car park (but not exclusively there). Here plants are very much affected by people, either by introductions or removals, though dumping of rubbish, including plants, wasn't much of a problem here. Dry weather affected the plants more in the car park than in the woods.' Five species of garden origin have shown significant increases in the last thirty years. Invasion by garden escapes is an increasing threat to semi-natural habitats. It is a difficult management problem that remains to be resolved if native flora is to be retained in anything like its original state.

### (b) Decrease of wasteland species

A number of wasteland species, present in every compartment thirty years ago, have decreased significantly. Perhaps the most remarkable loss was coltsfoot, which was recorded by Wrighton in every compartment, but after careful searching, is now found only in a single compartment (M3). David Bevan (pers. comm.) says that it also appears to be declining in the Haringey woods. These declining species are associated with open areas and not with trees. If they occur in woodland it is in more open areas such as rides, besides paths, etc. This finding appears to indicate that shading has increased significantly in the Ruislip Woods during the last thirty years. This was an unexpected finding and not previously recognized. It suggests that wasteland plant species can be 'indicator species' of structural change in woodlands which would otherwise be difficult to detect. If true, such changes may also have affected other wildlife (e.g. insects). In view of the fact that coppicing, with its opening up of areas, has been in operation since 1980, this is a somewhat surprising conclusion, but it is difficult otherwise to account for the decline in so many of these wasteland species. The temporary establishment of ground flora in newly coppiced areas may be less straightforward than expected. David Bevan (pers. comm.) reported an increase of species from 52 to 154 following coppicing an area in Coldfall Wood, Hornsey. Whilst non-native species have sometimes turned up in newly coppiced areas in the Ruislip Woods, e.g. Guernsey fleabane *Conyza sumatrensis* and Argentinian vervain *Verbena bonariensis* in Copse Wood in 2007, their less urban situation compared with Coldfall Wood probably accounts for the less aggressive invasion, but the behaviour of *native* wasteland species in newly coppiced areas needs further study.

### (c) Changes in native woodland species

Only foxgloves and guelder-rose decreased significantly. Was this also due to increased shading? However, five native species showed significant *increases*. It is difficult to suggest a common reason for this. Indeed, there may not be a single cause. Possible factors include changes in light, water-table level, temperatures at critical growth times, etc.

None of the species dealt with here is rare but the changes are of interest as part of the ecology of the Ruislip Woods National Nature Reserve. Whether they are of significance for other woodlands remains to be seen.

## Acknowledgements

I would like to thank Andrew Cox, Jess Lee, Jon Marks, Rita and Ken Merrifield, Roger Middleton, Francis and Michael Reid, Ann Rix, and Gordon Tranter, without whose recording help this article could not have been written.

## References

BOWLT, E. and BOWLT, C. 1982. Ruislip Woods. Their history and natural history. *Occ. Pap. Ruislip, Northwood & Eastcote Loc. Hist. Soc.* **3**.

BURTON, R. M. 1983. *Flora of the London Area*. London Natural History Society, London.

BURTON, R. M. 2001. Botanical records for 2004. *Lond. Nat.* **84**: 219–223.

GILBERT, O. and BEVAN, D. 1997. The effects of urbanisation on ancient woodlands. *Br. Wildlife* **8**: 213–218.

HAWKSWORTH, D. L. 1983. Management of the Ruislip Woods. *J. Ruislip Distr. nat. Hist. Soc.* **24**: 5–11.

KENT, D. H. 1975. *The historical flora of Middlesex*. The Ray Society, London.

LONDON BOROUGH OF HILLINGDON. 1982. *Ruislip Woods Long-term Management Plan*.

WRIGHTON, F. E. 1953. Plant ecology at Cripplegate, 1951–2. *Lond. Nat.* **32**: 90–93.

WRIGHTON, F. E. 1979. A survey of the flowering plants of Ruislip Woods. *J. Ruislip Distr. nat. Hist. Soc.* **22**: 5–20.

# Book review

***Aphids on deciduous trees.*** Tony Dixon and Thomas Thieme. Naturalists' Handbooks 29. Richmond Publishing. 2007. 138 pp., 35 figures, illustrated keys, 16 colour plates. £9.95 softback. ISBN 978 0 85546 314 4.

Anyone unfamiliar with the Naturalists' Handbook series may suspect that the latest volume, No. 29, like earlier titles such as No. 27 *Insects on cherry trees,* or No. 22 *Animals under logs and stones,* is aimed exclusively at the specialist. Those many London Natural History Society members already familiar with the Handbooks already know that, in fact, each volume provides a useful and convenient way for beginner or expert to learn more about entomological and ecological topics in digestible chunks. The series is published by experts: the Company of Biologists, a non-profit organization with objectives to promote research and study in biology. The series was founded by and is still edited by Sally Corbet and Henry Disney, who can be justifiably proud of their creation, started in 1983.

Studying entomology poses challenges for the novice as the field is so vast and the availability of authoritative identification guides is patchy. For these reasons, many find it is a good idea to take achievable, incremental steps to allow a satisfying degree of expertise to be built up. The Naturalists' Handbooks follow this idea and provide a highly practical way to learn as they 'reduce the problems of identification to manageable proportions'.

This volume is large by the series' standard at 138 pages, with identification occupying the bulk of the book. We learn that ash trees host a single aphid species (*Prociphilus fraxini*) as does elder (*Aphis sambuci*), whereas hawthorn may have seven, oak eight and sycamore nine. I find out that the honeydew falling on my car can only come from one of two lime aphids, and I can easily tell them apart as one has siphunculi as truncate cones (*Patchiella reamuri*) the other has siphulculi absent or inconspicuous (*Eucallipterus tiliae*). The identification key is written to the usual high standard although, with several new terms to learn, I struggled a little until I found the glossary on page 53, rather than as the more obvious Appendix. This includes some fascinating concepts such as *fundatrigenia, holocyclic* and *sexupara*. The identification section is sequenced by English host-tree name, and sycamore comes under 'M' (maple) and whitebeam under 'R' (rowan) which is a little confusing the first time through. I was unlucky to find *Stomaphis quercus* on a sycamore rather than the oak it is usually found on, so I needed extra help to identify it and the drawing in the key did not do justice to the spectacular rostrum.

Of interest to any naturalist, there are intriguing chapters covering the biology and ecology of aphids, including their habitats, predators and parasitoids, and factors influencing their abundance and distribution. We learn that aphids can reduce their generation time to one week, as development of an aphid starts inside its grandmother! A preconception I had was that predators such as ladybirds and hoverflies control aphid populations, but we learn that, counter-intuitively, predators and parasitoids are not a major influence on aphid population dynamics. Rapid turnover of generations make aphids highly suitable as experimental subjects.

One notable innovation for this volume is the use of colour photographs rather than the usual colour paintings. The photographs used here are well chosen to show the insects in life in their natural surroundings and are, in general, very good, although some lack a little contrast and definition. There are still places where colour paintings will be more effective, but I think the right choice has been made for this volume.

Volume 29 is a welcome addition to the Naturalists' Handbook series, being both traditional and innovative, and as accessible, affordable and authoritative as ever. Aphids on trees can be easily found from spring through to autumn, and have fascinating life cycles and ecology. For definitive identification work, mounted slides and a microscope (up to ×500) is recommended, although I have found that a lot can be done with a ×20 hand lens in the field. I recommend that this volume be acquired along with No. 11 *Aphid predators,* which contains a comprehensive guide to predators as well as a useful identification guide to aphids found commonly on herbaceous plants and conifers.

MICK MASSIE

# The fishes, amphibians and reptiles of Bushy Park, Middlesex

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## Summary

The presence of sixteen species of fish and five native and one non-native species of herpetofauna in Bushy Park, Middlesex (TQ 155 698) is described.

Three separate surveys, conducted concurrently between 1999 and 2007, revealed good populations of three amphibians: the smooth newt *Triturus vulgaris*, common frog *Rana temporaria* and common toad *Bufo bufo*, which were recorded widely in aquatic and terrestrial habitats in Bushy Park. A fourth amphibian, the great crested newt *Triturus cristatus*, was recorded rarely and infrequently and is possibly threatened with extinction. There is one confirmed native species of reptile: the grass snake *Natrix natrix*, which is present at low density in less-disturbed habitats. There have been no verified records for the palmate newt *Triturus helveticus*, common lizard *Lacerta vivipara*, slow-worm *Anguis fragilis*, or the adder *Vipera berus* from Bushy Park. A species of North American terrapin, the red-eared terrapin *Trachemys scripta elegans*, was formerly present, but has not been seen in the Park since 2001.

The occurrence of sixteen species of fish in the freshwater habitats of Bushy Park is described in both historical and contemporary contexts, and compared to the fauna of other important wildlife sites in west London.

Current threats to the extant populations of fishes, reptiles and amphibians of Bushy Park are discussed.

## Introduction

This work began as two separate papers describing the fish and herpetofauna of Bushy Park respectively. As these papers progressed, it became clear that the reptiles, amphibians and fish of Bushy Park have all been affected by the occasionally extreme aquatic and terrestrial habitat changes that have occurred during the last 600 years, and in view of that common history, particularly with respect to the common habitat requirements of certain fish and amphibians, the papers were amalgamated.

Bushy Park is a royal deer park situated between Teddington and Hampton Court in west London and, after Richmond Park, is the second largest of London's octet of Royal Parks. Until recently, the wildlife of Bushy Park, with the notable exception of its aculeate hymenopteran fauna, was poorly understood. Ecological surveys conducted from 1999 onwards, revealed that Bushy Park has a remarkable biodiversity and is a site of significant conservation value, particularly in terms of its entomological fauna, which is regarded to be of national and international importance (Sutton and Baldock 2003, Baldock and Sutton 2006, Denton 2006, Sutton 2006*a*, *b*, 2007). The park also harbours some increasingly important populations of herpetofauna in the London Area, including the grass snake *Natrix natrix* and the great crested newt *Triturus cristatus*.

The flat land on which Bushy Park is now situated is characterized by light gravely soils and Williams (1978) writes: '. . . the whole area appears to be a tawdry extension of Hounslow Heath, to which it is immediately adjoined.' This land has a long history of cultivation and is believed to have been settled for over 4,000 years. The site has produced a number of Bronze Age relics (including a superb example of a dagger which now resides in the British Museum), and it is still of great archaeological importance in terms of farming history, representing as it does, the most extensive and complete example of the medieval ridge and furrow field system in Middlesex.

In a comparatively recent context, the history of habitat change effectively begins when the land within this loop of the Thames was acquired by the Knights Hospitallers of St John of Jerusalem in 1237 from Henry de St Albans, who had used these two thousand acres of manorial land to graze two thousand sheep (Minney 1972). By the time the land had been leased from the Knights Hospitallers by Cardinal Wolsey for the sum of £50 a year, records reveal that it had again been subject to cultivation, notably to the east of the village of Hampton. In fact, all of the area eventually enclosed by Wolsey (some of which was additionally acquired from neighbouring manors to create a larger area for the purpose of deer hunting), with the exception of a large managed rabbit warren, had been ploughed farmland. It was Wolsey's desire to create a Park fit for foreign dignitaries to hunt deer that signalled the beginning of a fundamental change in the way the land would be managed henceforth. Bushy Park's next patron, Henry VIII, went on to introduce more game stock to the Park, including pheasants and partridges, and was also said to have kept the ponds well stocked with fish, although it is unclear which species were stocked at the time.

Regarding the wetland habitats in the Park, it is not known to what extent water bodies existed at that time. Presumably there were ponds and ditches present for the benefit of livestock, and also naturally occurring wetland areas which hold water in a temporary manner as some regions of the Park do today. Certainly there is a suggestion that the land was prone to becoming waterlogged, and during the reign of Queen Anne, ditches were dug to facilitate the drainage of the land.

Prior to this, a landscape altering change had come during the reign of Charles I, who ordered the construction of a canal to bring fresh water to his residence at Hampton Court from the chalk-stream-fed River Colne. This extraordinary twelve-mile-long canal, now known as the Longford River, was dug by hand using labour from the respective parishes through which it ran and took nine months to construct. Significantly, the Longford River is responsible for feeding the majority of freshwater habitats within Bushy Park.

The Longford River was not popular with those whose land it ran through, since it was prone to overflow periodically, inundating crops and drowning livestock. During the unrest of the Civil War, its bridges and associated structures were damaged and parts of the river were filled in. This wilful damage was reversed on the orders of Oliver Cromwell, who had now taken up residence at Hampton Court. Cromwell also had a hand in the creation of fresh water habitats in Bushy Park, and was responsible for diverting the Longford River to fill the man-made ponds to the east of the park in 1680.

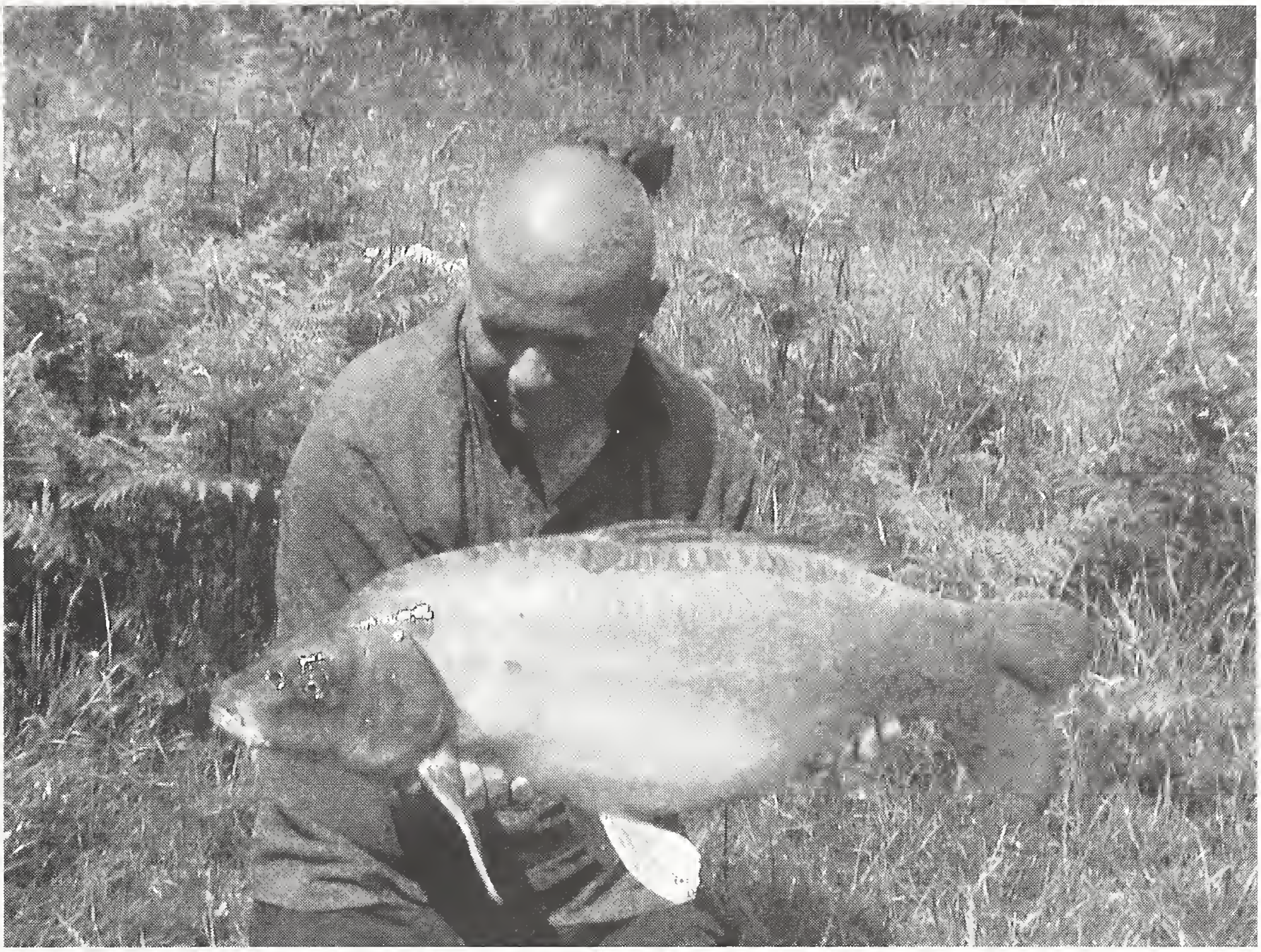

FIGURE 1. A 20 lb+ mirror carp caught from the Heron Pond.

These are the Heron and Leg of Mutton Ponds (the latter was formerly known as Oliver's Pond) which today are well stocked with fish and provide popular venues for anglers, particularly those who focus their attention on the carp that can attain a considerable size in these waters (Figure 1). According to one Royal Parks leaflet, carp in Bushy Park can reach weights of up to 35 lb and recently, one well-known carp has exceeded the 40 lb mark (John Comfort, pers. comm., 13 May 2008).

Later came the construction of the Diana Fountain which was planned by Sir Christopher Wren during the reign of William III and Mary II. This great basin, four hundred feet across and five feet deep, with its magnificent centrepiece, the statue of Arethusa (now known as Diana), provides another fishing venue, and like the Heron and Leg of Mutton Ponds, is a magnet for 'specimen hunters'. Other important freshwater habitats include the Canal Plantation, which was created in the early eighteenth century on the instruction of the first Lord Halifax, and the beautiful ponds and streams to be found in the Waterhouse Woodland Gardens. (Halifax was also responsible for creating the once-dramatic water garden at the Upper Lodge, with its waterfalls and grottoes). Today Bushy Park is represented by a freshwater resource which includes seven ponds and 10.5 km of rivers and streams (Land Use Consultants 2005). The freshwater habitats of Bushy Park contribute to the 3,220 km of rivers and streams of the London Basin, which is the longest lowland riverine resource in any natural area in the UK (English Nature 1997).

The character of the Park was changed dramatically with the planting of thousands of trees during the various reigns of the kings and queens of England who oversaw the development of Bushy Park. It should be noted, however, that one Ranger of Bushy Park, the future William IV who moved into Bushy House in 1797, was responsible for cutting down many trees (768 in his first year as Ranger) and letting the land to tenant farmers (The Royal Parks 1993). In recent years it has been recognized that the woodland habitat of Bushy Park, which provides an important terrestrial habitat for its amphibians, includes some outstanding examples of veteran trees which harbour a saproxylic invertebrate fauna of international importance (e.g. Denton 2006). A large number of trees were lost during the great storms of 1909, 1987 (this 'hurricane' claimed 1,329 trees in Bushy Park) and presumably 1990 (which, together with the 1987 storm felled over 1,000 mature trees in Richmond Park) (The Royal Parks 1993).

During the Second World War, Bushy Park was again subject to dramatic disturbance. The Park was occupied by three thousand army personnel (The Royal Parks 1997). The construction of the army barracks on the north-east side of the park resulted in large-scale alteration of Park habitat (the last of the huts finally being removed in 1963), and the water bodies of the park were also significantly disturbed. It appears that the Bushy Park ponds (unlike the Richmond Park ponds) were spared from being drained, and were instead covered with wire mesh and camouflaged from aerial recognition.

Today Bushy Park provides a variety of good quality freshwater habitats for fish and amphibians and also provides some areas of suitable and generally undisturbed habitat for terrestrial-phase amphibians and a low density population of reptiles.

## Historical records of fishes, amphibians and reptiles from the west London region

In a previous paper (Sutton and Baldock 2003) the presence of the remarkable aculeate hymenopteran fauna of Bushy Park was linked to the fact that there was a relative abundance of valuable habitat available within a comparatively small area of west London. We referred to this region as the 'Ham Radius', which is described by the area within a five-mile radius of Ham in Surrey. This area contains a number of important wildlife-rich sites including Bushy Park, Richmond Park, Wimbledon Common and Putney Heath, Hounslow Heath, Barnes Common and several other sites which are smaller, but nevertheless significant in terms of the biodiversity that they harbour. Many of these sites have comparable habitats and would probably have had a similar fauna in centuries past, so it is useful to ascertain which species might have been historically present in those habitats in order to place the current fauna into perspective.

### Fish

Margaret Varley (1985) provides an explanation for our relatively impoverished British freshwater fish fauna in terms of events that occurred in the wake of the last ice age, where routes of entry to post-glacial freshwater habitats were through the rivers now represented by the Great Ouse and the Thames. These rivers were probably tributaries of an even greater continental river which today is represented by the Rhine. The presence of fish species which are indigenous to certain east-flowing rivers in eastern England, i.e. the spiny loach *Cobitis taenia*, the now-extinct burbot *Lota lota* and the silver bream *Blicca bjoerkna,* suggests that the Thames and southern East Anglian rivers may not have been confluent with the Great Ouse and its tributaries, which may explain the different patterns of post-glacial colonization observed (Perrow and Jowitt 2000). The fish of the London region are represented to a large extent by the natural fauna which is present in the Thames and its tributaries.

However, an analysis of the fish that were historically present in this region is complicated by the fact that they can be divided into two distinct groups: those that represent the natural riverine fauna; and those that have been deliberately stocked, with an obvious blurring of boundaries occurring when natural populations are increased through stocking.

The majority of freshwater habitats in Bushy Park depend on the Longford River for replenishment. In order to describe the fauna likely to be present in Bushy Park, it is useful to describe those species that have been recorded from the River Colne and its tributaries, to give an indication of which species would be likely to occur naturally in the Longford River and its associated water bodies in the absence of artificial introductions. According to Wheeler's (1958) comprehensive review of *The fishes of the London Area* there are fourteen species recorded from the River Colne and its tributaries: pike *Esox lucius*, gudgeon *Gobio gobio*, tench *Tinca tinca*, minnow *Phoxinus phoxinus*, chub *Leuciscus* (*Squalius*) *cephalus*, dace *Leuciscus leuciscus*, roach *Rutilus rutilus*, rudd *Scardinius erythrophthalmus*, bronze bream *Abramis brama*, stone loach *Noemacheilus barbatulus*, eel *Anguilla anguilla*, perch *Perca fluviatilis*, bullhead *Cottus gobio* (on account of the fact that it 'probably occurs in all rivers in the area', but is 'Very poorly recorded'), and the three-spined stickleback *Gasterosteus aculeatus*.

Even so, some of these species may represent introductions, and obvious candidates are those species that are typically associated with stillwater habitats or the lower reaches of rivers, i.e. bronze bream, tench, rudd and possibly pike. There are also species which would have been naturally present, but have had their numbers bolstered by stocking, such as roach and perch. The remaining species: minnow, chub, dace, gudgeon, stone loach, eel, bullhead and three-spined stickleback (together with roach, perch and probably pike) are all likely to represent the original riverine fauna of the Colne/Longford River system.

Regarding the recent fauna of Bushy Park, Wheeler (1958) concludes that the following eight species of fish are present: pike, carp *Cyprinus carpio*, tench, roach, bronze bream, eel, perch and stickleback. Marlborough (1972) does not add to this list.

A recent assessment (Mayor of London 2005) of the 2.7-km stretch of the Longford River, owned and managed by The Royal Parks, that runs through Hampton Hill into Bushy Park concluded that:

> 'The river holds good populations of fish, including chub, roach, dace and gudgeon',

and it can be assumed that all of these species are therefore present in the continuation of the Longford River as it runs through Bushy Park.

Simms (1974: 36) writes:

> 'The many waters are richly stocked with fish. There are pike, tench and roach in at least four of the lakes and ponds, including the Long Water which also holds rudd, perch, bleak, gudgeon, carp and eels. There are bronze bream in the Diana Pond and sticklebacks in a stream near the Waterhouse Plantation.'

The occurrence of bleak *Alburnus alburnus* in the Long Water is of interest. The Long Water is part of Hampton Court and is fed by the Longford River via Bushy Park.

Bleak, which, together with roach were among the first species to recolonize unpolluted stretches of water on the Thames, can often be abundant where they occur. Bleak were not recorded from the Colne/Longford River system by Wheeler and with no obvious route to the site where it was reported, its presence in the Long Water is believed to originate from the 'liberation of unused "live-bait"' by anglers (Wheeler 1958). This is not an uncommon practice, and was also responsible for the introduction of pope (also known as the ruffe) *Gymnocephalus cernuus* into Loch Lomond in Scotland (Perrow and Jowitt 2000).

The Royal Park's website (2007) states that:

> 'In 2002, *Angler's Mail* reported the catching of a 5 lb 1 oz crucian carp which may well be a new record for that species' and also reports that 'Bushy Park's many ponds and streams are home to a good range of fish including perch, roach, chub, bream and rudd.'

The Environment Agency's guide to coarse and game fisheries in the Thames and South-East region for the 2007/2008 season states that the Heron, Leg of Mutton and Diana Ponds in Bushy Park all currently contain populations of pike, bronze bream, roach, carp and tench (Environment Agency 2007).

A popular fishing website (Total-fishing 2008) adds eels to the above list, and reveals that pike fishing in Bushy Park is not allowed before 1 October.

Simms (1974) makes no mention of the chub which are now so clearly evident in the Longford River and its tributaries (Figure 2). However, it is probable that they may not have been present at the time when he was writing his review of *Wildlife in the Royal Parks* owing to poor water quality in the Longford River.

FIGURE 2. Chub and roach can be seen in the canalized stretch of the Longford River that flows towards Hampton Court.

Similarly, Wheeler (1958) and later, Marlborough (1972) (who reported that recent improvements in water quality had led to the appearance of at least three fish including 'three-spined stickleback, roach and bleak' in the River Lea), do not report the presence of chub and several other expected species in the Longford River which today appears to have good water quality and supports a healthy population of plants and invertebrates. Regarding the invertebrates, David Leeming, in his assessment of the aquatic invertebrate fauna of Bushy Park, noted that the Longford River produced 'exceptionally rich invertebrate assemblages in places', and stated that its populations of species of conservation importance, including those like the mayfly *Ephemera lineata* that are vulnerable to extinction, have ensured that 'the Longford River including its South Branch ranks as one of the most important rivers in Greater London' (Leeming 2005).

It is clear that the absence of records for certain riverine species reflects the fact that aquatic habitats in Bushy Park have not always been as healthy, and Leeming (2005) elucidates with the following useful summary:

> 'The various sections of the Longford River that occur within Bushy, also contribute significantly towards the pool of species found within the Park, and provide a source of relatively clean, unpolluted water to a series of ornamental water features of varying importance for wildlife. However, anecdotal evidence suggests this may not always have been the case. During the late 1970s and early 1980s aquatic plants were absent, and water was turbid throughout the summer months in the Longford River (south branch) and Diana Fountain Pond (*pers obs*). Prior to this, in about 1974, Diana Pond was clear watered but had extensive coverage by mats of filamentous algae that smothered submerged aquatic plants in the summer. Periodic fish kills brought about by deoxygenation also occurred. By the late 1970s, these symptoms of eutrophication (nutrient enrichment) had culminated in the total loss of submerged vegetation from the lake and their replacement by dense phytoplankton. A similar situation also existed within Heron Pond during this period (pers. obs.). Over the intervening two decades water clarity has improved substantially in Diana Fountain Pond and Heron Pond, which now contain submerged higher plants. The Longford south branch has also changed beyond recognition with the establishment of fringing emergent plants and extensive areas of submerged vegetation. These structural habitat changes within the river, and at least several of the lakes are probably inter-related and are certainly desirable from an ecological point of view. The causes of the recent colonisation of the Longford River by aquatic vegetation are unknown but may be linked to seeding of the river arising from planted berms introduced as part of habitat enhancement work near Cobblers Bridge, or by changes in watercourse management practices. In any case, aside from providing an improved diversity and quality of habitat for invertebrates (and other river corridor wildlife) the habitat changes in the river have also increased its ability to purify polluting loads, including plant nutrients derived from remote sewage treatment effluent discharges to the River Colne.'

There have been nine species of fish recorded from Richmond Park. Collenette (1937) states that:

> 'The fish in the ponds consist of pike, bream, carp, roach and eels. Perch, dace, gudgeon and tench have also been mentioned as occurring, but I have not heard of any being caught in recent years, although perch were present in 1890.'

Williams (1978) states that:

> 'the Pen Ponds are well-stocked with fish' and reiterates essentially the same species; 'bream, carp, dace, gudgeon, perch, pike, roach and tench'.

Between these two publications came the Second World War, and like Bushy Park, Richmond Park habitats were affected by wartime activities. The ponds, which were known to aid the navigation of incoming bombers, were drained, and Fitter (1953) writes:

> 'When the Pen Ponds in Richmond Park were drained in 1940 a large number of fish were removed, and in many cases transferred to other ponds in the neighbourhood. They included 175 carp, 320 bream, 250 pike, 300 eels, 30 perch and 20 dace.'

Fourteen species of fish have been recorded from the freshwater habitats of Wimbledon Common and Putney Heath, but only eight of these have been recorded in recent years: common carp (and koi carp), perch, goldfish *Carassius auratus gibelio*, rudd, roach, tench and pike and three-spined stickleback (Drakeford and Sutcliffe 2000). The goldfish and koi carp (a form of *Cyprinus carpio*) populations are believed to have originated from owners discarding unwanted pets.

Other species which were formerly known to be present at the site were: gudgeon, dace, eel, bullhead, stone loach and three-spined stickleback (Wheeler 1958), all of which relied on Beverley Brook for their existence. Beverley Brook is an ancient waterway which runs along the eastern edge of Wimbledon Common and the western edge of Richmond Park, and in recent years apparently held only a population of the three-spined stickleback. This stream was formerly known to be the route through which eels would arrive in

May to instigate the annual 'Eel Fair' in Richmond Park, an event which ceased when the eels disappeared along with other species of fish in the polluted Thames in years past. However, although pollution must have had a degree of bearing on eel populations, other factors must also have played a role in their observed decline. Wheeler (1958) states that the eel is:

> 'probably the only species to pass regularly through the polluted lower Thames',

and Marlborough (1972: 73) adds:

> '. . . the eel cannot be said to be recolonising the polluted reaches — for it never left them.'

This suggests that alterations to the Beverley Brook, together with declining natural stocks (to the extent that the eel is now considered to be a threatened species and worthy of inclusion on Appendix II of IUCN global assessment criteria (ICES 2006, Feunteun 2007)), had an impact on its disappearance in such numbers from Richmond Park and other former haunts.

The loss of dace, gudgeon and the formerly resident species listed above was, however, undoubtedly attributable to the state and source of Beverley Brook, which received effluent from the old Worcester Park Sewage Works. Turtle (2000: 21) points out that:

> 'In the past the Brook has been highly modified with frequent culverts, straightening and artificial banks and substrates, and the water quality has always been classified as poor.'

Beverley Brook also relies on treated sewage effluent 'which can constitute 90 per cent of the flow' for its water supply (Turtle: 2000: 22). However, with recent developments, notably the replacement of the old sewage works with the Hogsmill Water Treatment Plant, the water quality of Beverley Brook has improved to such an extent that it prompted the following Royal Parks press release (2004):

> 'Species of fish that had been absent for decades have been found in the brook once again indicating that ecological recovery is well underway', and continues, 'Local volunteers two years ago found newly arrived fish in the brook, including, oddly, a large goldfish and this year the volunteers have found dace, roach and sizeable chub, all in good condition.'

Subject to confirmation of their presence at the respective sites, species now being recorded in Beverley Brook (including the apparently hitherto unrecorded chub) may be added to the Richmond Park and Wimbledon Common faunas. It is also likely that eels, which may always have been present, but which, although recorded from Beverley Brook in 1992 by the NRA Fisheries Unit (along with tench which were believed to have entered Beverley Brook from the overflow channel of the Queensmere Pond on Wimbledon Common) are not listed as part of the current fauna by Drakeford and Sutcliffe (2000), still occur in Beverley Brook and possibly other freshwater habitats on Wimbledon Common and Putney Heath.

## Amphibians and reptiles

Prior to the recent surveys, there have apparently been no documented studies of reptiles and amphibians in Bushy Park, and there are very few references in available literature regarding its fauna. References include: Simms (1974) who reported the presence of common toads and frogs; a Royal Parks leaflet (undated) which states that the 'grass snake *Natrix natrix* is an "*established*" species in the Park'; and Wycherley (2003), who reported the presence of unidentified water frogs in Bushy Park (TQ 146700) in 1995. Regarding the presence of water frogs in Greater London, Wycherley (2003) writes:

> 'Water frogs located in the ponds around Heathrow are reputed to have escaped from a consignment from Turkey confiscated by Customs officials. Water frogs have been seen in Richmond and Bushy Parks and along the Longford River and River Crane. Large numbers of marsh frogs occur in the Staines Reservoirs and Kempton Park racecourse to the west of London.'

Wycherley also recorded a great crested newt egg[1] that was found on aquatic vegetation in an ephemeral pond in Bushy Park in 1994 (J. Wycherley, pers. comm., 7 May 2008). The location was probably to the north of the Conservation Area, since there were no ponds in the vicinity of the Conservation Area prior to its construction, and the only ephemeral ponds in the area described were likely to be found in the Brewhouse Meadows (Ray Brodie, pers. comm., 8 May 2008).

John Comfort (pers. comm., 8 May 2008) remembers finding what he thought were many great crested newts at the Canal Plantation as a boy, specimens of which he considered to be 'much larger than the average newt'. In the intervening decades this site has become well shaded by bankside trees and vegetation, and prior to recent netting, contained a large population of carp *Cyprinus carpio*.

The distribution maps produced by Langton (1991), which represent the culmination of all previous reptile and amphibian records to that date, show that the following species are unrecorded from Bushy Park: grass snake, adder, common lizard, slow-worm, great crested newt and palmate newt. In accordance with Langton's recognition of the fact that distribution maps can suffer from both under-recording and recorder bias, there is a need to ensure that records for species like the grass snake, which is clearly established in Bushy Park, are recognized.

There are two other comparatively well-documented sites within the Ham Radius: Richmond Park, and Wimbledon Common and Putney Heath.

Historical records from Richmond Park stem from the original work by Collenette (1937) who states that:

> 'The Common Frog breeds in several of the smaller ponds of the park, where it is often disturbed by small boys. The Common Toad is less frequent, but I have come across one on two occasions in recent years. The Smooth Newt can also be found in the smaller ponds, but I have heard no mention of the Crested Newt, although it may well be present. I have been told that a Slow-worm was found some fifteen or twenty years ago in the south of the park, but have been unable to obtain any details. Mr Rudge Harding, in the park report for 1931, speaks of an Edible Frog which in some manner found its way to Bishop's Pond and greatly puzzled a gamekeeper in a neighbouring cottage by its monotonous song. Another stranger was a Tortoise, probably *Emys orbicularis* L., seen by Mr. Holte Macpherson on 31st July 1934, basking on a log in the Upper Pen Pond.'

As mentioned above, Wycherley (2003) also reports the presence of water frogs at Richmond Park, and Fitter (1949: 114) states that:

> 'Ham Common and gravel pits and Richmond Park have been well-known localities [for edible frogs] for some years.'

Fitter (1949: 114) also reports that:

> '. . . the attempt of members of the British Herpetological Society to introduce edible frogs on Hampstead Heath by releasing five caught at Ham gravel pits in two ponds on Golders Hill in late June or early July 1948 . . . was a case of carrying coals to Newcastle',

on account of the fact that there was already known to be a substantial colony of over 200 adults in the various ponds of Hampstead Heath at that time.

Atkins and Herbert (1996) report a single remaining population of crested newts somewhere within the borough of Richmond-on-Thames, although the location of this colony in relation to the Ham Radius sites is unknown.

There is a notable absence of palmate newt records across the West London region, and this species has not been reported from any sites within the Ham Radius according to post-1980 records (Langton 1991).

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[1] Green (2001) has provided an excellent paper regarding the identification of the eggs, larvae and efts of great crested newts, and states that the benefits of this approach are, 'that it can be relatively quick, it proves whether a wetland actually holds a breeding population of great crested newts (adults do temporarily inhabit ponds on their journey to and from their true breeding site), it is less disruptive to the wetland habitat than is netting for adults and, as the female lays between 200 and 300 eggs, there is a greater probability of recording the species.

For the adder also, Langton et al. (2005: 79) offer the following dismal summary:

> 'Today in Greater London only five very small populations of adder remain, only two of which are possibly derived from original natural populations. Extinction here has been prevented by protective actions, restocking and introductions/reintroduction over the last twenty years.'

The Wimbledon Common and Putney Heath area appears to have been an important site for herpetofauna in London. In addition to a long-lost population of sand lizards, it formerly held a population of natterjack toads *Bufo calamita*, which although considered to be absent by Johnson in 1912, was regarded to have been well known until 'recent years' by Harrison in 1935 (Fitter 1949). Arnold (1995) shows a string of open circles confirming that this species was once present on the heathy commons of south and west London. The environmental reasons for its dramatic decline from this region are discussed by Beebee (1977).

Fitter (1949) reports a record of the great crested newt from Wimbledon in 1930, but this species is not recorded in the recent review of the reptiles and amphibians of Wimbledon Common and Putney Heath by Drakeford and Sutcliffe (2000), who report the following status of extant species: smooth newt 'super abundant', common frog 'abundant[2]', common toad 'less common than the frog'; common lizard 'fairly abundant throughout the Commons but a recent decline has been noticed', grass snake '. . . the species survives on the Commons in small numbers. The most recent sighting was in 1995 . . .', adder 'rare or absent from the Commons'.

Regarding the grass snake, the post-1980 LNHS maps show it to be unrecorded from the entire south-west quadrant of Greater London south of the Thames (Langton 1991). The adder, which may have been present on Wimbledon Common in the latter half of the last century, was not recorded by Fitter (1949), Yalden (1967) or the review of Langton (1991). Drakeford (in Drakeford and Sutcliffe 2000: 163) writes:

> 'Past records refer to adders (or vipers) and sand lizards inhabiting the heathland, but sadly neither has been seen recently on the Commons.'

Of the twenty-three remaining adder sites in the LNHS Area, and the five remaining sites in Greater London, none is in the south-west quadrant of Greater London south of the Thames (Langton et al. 2005).

The crested newt, or the slow-worm which is described by Fitter (1949: 112) as being, 'Decidedly local in the London Area, especially north of the Thames', have not been recorded from the Commons, and their historical status at the site is unclear. No records for the slow-worm are reported from Middlesex by Yalden (1967), and the distribution map provided by Langton (1991) shows that there are no post-1980 records for this species at any of the Ham Radius sites. (Further afield, these maps document the extraordinary loss of herpetofauna in the wake of the urban development of the Elmbridge district (Weybridge, Esher, Cobham) of south-west London.)

Fitter (1949) reported that the common lizard disappeared from the Kew Gardens area around 1906 (and that it had been lost from Hampstead Heath by 1912). In more recent times, and regarding the observed decline of the common lizard at Wimbledon Common, similar declines have been noted elsewhere, and Langton (1991: 104) concludes that:

> 'It is hard to determine whether the common lizard has really seen a crash in its previous southwest and southeast strongholds. Local knowledge of these two areas suggests that there have been considerable declines.'

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[2] It appears that the fears of Yalden (1965) and Burton (1976) regarding the decline of the common frog in the London Area have not been realized, and this is almost certainly due to the creation of ponds in gardens. Langton (1991) roughly estimated that the number of garden ponds in the London Area at the time of publication was 106,000, of which, perhaps, '16,000 will have one or more species of amphibian', and suggested that, 'In much of urban London you are probably never more than tens of metres from the nearest common frog, making it one of the most common terrestrial vertebrates and possibly numerically one of the most abundant.'

It is interesting to note that the 10-km resolution distribution maps for British reptiles and amphibians presented by Arnold (1995), like the 10-km maps produced for some of our commoner butterflies (e.g. Asher et al. 2001) do not reveal the dramatic declines experienced by species in both groups which become clearly evident when mapped at the 1-km level, and are likely to give a false impression of the general fortunes of these species.

In recent years, terrapins have been discarded by pet owners, presumably after they have become less manageable and undesirable as they get larger. In the aftermath of a cartoon-based craze in the 1990s, many were released into the nearest convenient water body. The most frequently discarded chelonian is the red-eared terrapin *Trachemys scripta elegans*, which has been recorded in some numbers in the ponds of Wimbledon Common, along with the European pond tortoise and a single specimen of a snapping turtle (Drakeford and Sutcliffe 2000). The identity of this snapping turtle, which was described as being 'obnoxious' and a 'vicious beast' for having the ability to 'inflict a serious bite when handled', remains unknown, which is surprising since it would presumably have been fingerprinted.

In addition to the water frogs reported by Wycherley (2003), another notable alien in close proximity to Bushy Park is a population of common wall lizard *Podarcis muralis* found on two railway bridges near Hampton, which in 1979, had an ongoing presence at the site for over two decades (Stiles 1979).

## Recording the fishes, amphibians and reptiles of Bushy Park: study area and methods

During 2004, a number of baseline ecological surveys of Bushy Park, commissioned by The Royal Parks, were undertaken by Land Use Consultants (2005.) Within that suite of surveys was included a baseline evaluation of the herpetofauna of Bushy Park. This study involved a specific survey for reptiles using corrugated steel tins (1 m × 0.5 m). A minimum of twenty of these artificial refugia were placed in each of four different areas of the park, away from the disturbance of deer and public. These 'tins' were inspected on seven occasions from 11 September to 8 October to collect data which included incidental records of amphibians.

Records of amphibians and fish observed during the study of aquatic invertebrates by David Leeming on 15–16 June 2004 (Land Use Consultants 2005) were obtained using standard sampling methodologies (e.g. Murray-Bligh 1997) which attempt to ensure comparability of results between sampling sites. Long-handled pond nets were used to survey all aspects of aquatic habitats within the study area. Observations of the herpetofauna and fish of Bushy Park were documented by the author between 1999 and 2007 during a long-term study of the fauna present in a variety of habitats across the Park. This study was undertaken with kind permission from The Royal Parks Agency (a permit is required to undertake wildlife survey work in Bushy Park).

The study area for all of the surveys described is encompassed by the walls of Bushy Park (TQ 155 698), occupying an area of approximately 450 hectares.

## Results

### Fish

The study of aquatic invertebrates by David Leeming (Land Use Consultants 2005) recorded the incidental presence of eight species of fish in Bushy Park: common carp, tench, chub, dace, roach, stone loach, bullhead and three-spined stickleback.

The ongoing survey by the present author (1999 to date) has recorded the presence of thirteen species, which in addition to the list above includes: perch, pike, eel, rudd and bronze bream. Three additional species, the crucian carp, goldfish and the gudgeon, were not recorded during the above surveys, but are known to be present in Bushy Park.

## An annotated checklist of the fishes of Bushy Park

PIKE *Esox lucius* (Linnaeus, 1758)

The author has observed several pike in a well-vegetated section of the Longford River; a juvenile, approximately two inches long (Figure 3) from the outflow of the Leg of Mutton Pond, and an approximately 5 lb adult in margins of the same pond. This species is also present in the Heron and Diana Ponds and is recorded from the following 1-km squares: TQ 1569 and 1669. The largest pike recorded to date was an 18.5 lb female taken from the Boating Pond (John Comfort, pers. comm. 13 May 2008).

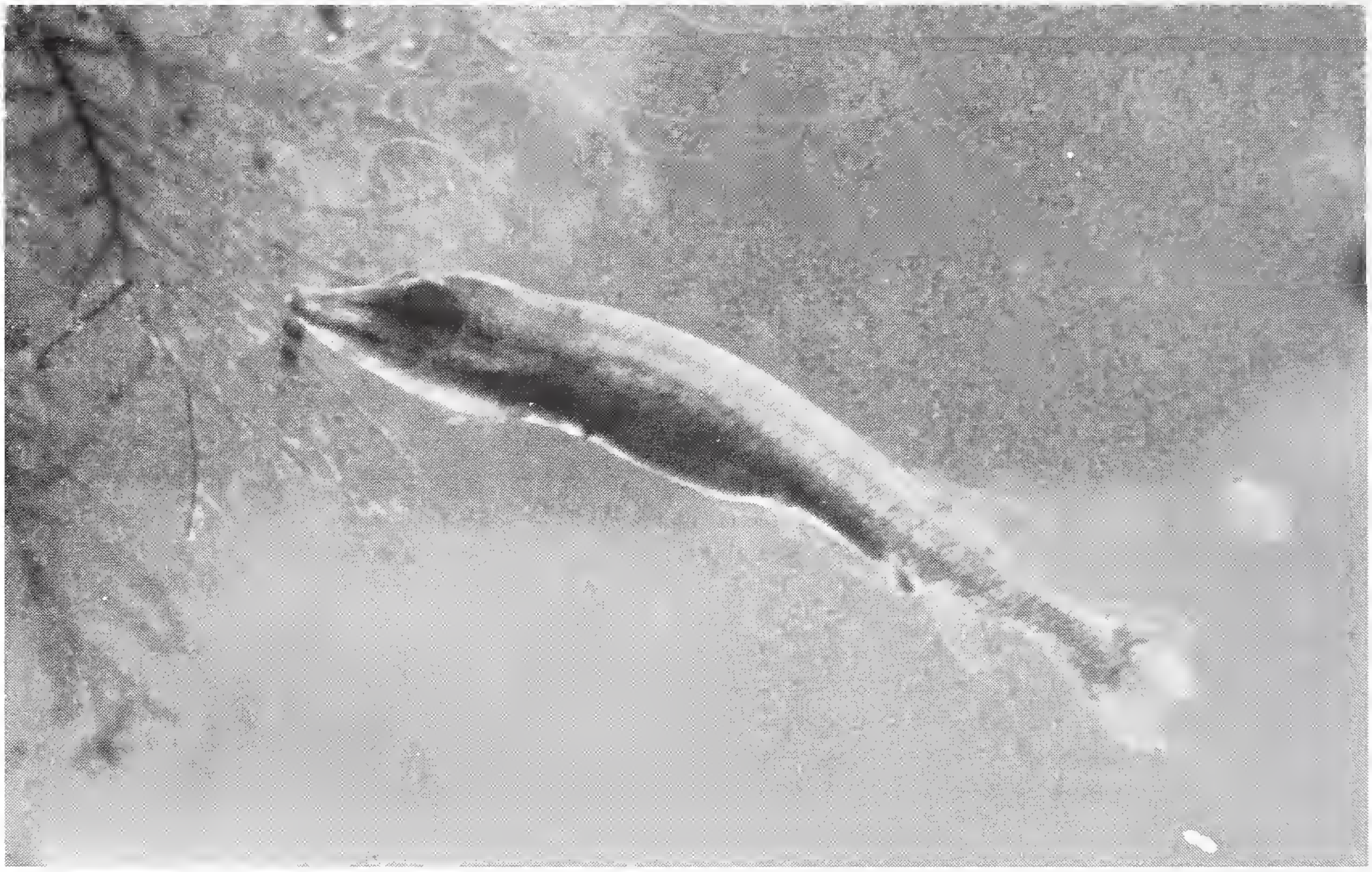

FIGURE 3. Juvenile pike recorded from the outflow of the Leg of Mutton Pond.

COMMON CARP *Cyprinus carpio* (Linnaeus, 1758)

Common carp are one of the commonest fish in Bushy Park and appear to be present in the Longford River and all of the water bodies it feeds. It is present in its usual forms, the typical fully scaled 'common carp', leather carp and mirror carp. In spring large specimens can be seen in the Heron and Leg of Mutton ponds as they jump, occasionally clearing the water altogether and revealing the bright orange and yellow coloration beneath their tails. This species has been recorded from: TQ 1469*, 1470, 1569* and 1669* (an asterisk* denotes that a presence in these 1-km squares is also confirmed by the LUC report (2005)). The larger carp caught from these waters are well known and have their own individual names. The largest of these, known as Single-scale, was caught in December 2007 at a weight of 41.5 lbs. A possible reason for the weight gains of these large fish has been attributed to the predation of Chinese mitten crabs in the spring and autumn when their soft bodies are vulnerable to attack after moulting (John Comfort, pers. comm. 13 May 2008), although the constant provision of large quantities of artificial baits undoubtedly provides a considerable source of food for the fish in these waters.

CRUCIAN CARP *Carassius carassius* (Linnaeus, 1758)

This species has not been recorded by the author, but from regular discussions with anglers, it is possible that the 5 lb 1 oz crucian carp reported by The

Royal Parks website may have been caught from the Leg of Mutton Pond (TQ 1669) where this species has been taken in the vicinity of floating vegetation. Crucian carp *Carassius carassius* readily hybridize with common carp (and more recently, feral goldfish *Carassius auratus gibelio*), which leads to problems regarding the submission of potential new records for this species. Bona fide records will currently only be accepted from waters which have been certified by the BRFC (British Record Fish Committee) to contain crucian carp that are known to be unaffected by hybridization. (In the absence of this certification, the BRFC advocates the use of DNA testing to verify the validity of potential new crucian carp, rudd, roach and silver bream records.) Hence, the Bushy Park record was not validated. Crucian carp have also been recorded from the Heron Pond (John Comfort, pers. comm. 13 May 2008) and was present in the Diana Pond in 1988 (Ruth Kirk, pers. comm. 26 May 2008).

### GOLDFISH *Carassius auratus gibelio* (Linnaeus, 1758)

Goldfish (which, as previously mentioned, may hybridize with crucian and common carp) may still be present the Heron and Leg of Mutton Ponds. They have been released into the waters of Bushy Park as unwanted prizes when the annual fairground is set up next to the park (John Comfort, pers. comm. 13 May 2008).

### BARBEL *Barbus barbus* (Linnaeus, 1758)

This species is present in the Thames between Richmond and Bushy Parks. Although this species was not recorded from the River Colne by Wheeler (1958) it has been stocked in this river in recent years and large specimens up to 14 lb may be caught from popular fisheries along its Middlesex stretches. This species does not appear to have attempted to colonize the upper stretches of the Longford River which has been, together with the Duke of Northumberland's River, subject to an extensive diversion project. The Duke of Northumberland's River is an even older artificial waterway than the Longford River, and was built in the sixteenth century (1530s) to convey water for domestic and industrial use to population centres south-east of Heathrow. The Twin River Diversion Scheme involved the diversion of these historic twin rivers, which previously ran beneath Heathrow Airport, to a concrete channelled course around the edge of the new Terminal 5. The environmental sensitivity applied to this extraordinary £75 million pound feat of engineering has been highly commendable, and has included: the translocation of appropriate river substrates to the concrete courses; the provision of 8,000 square metres of pre-grown native plants; appropriate planning for the colonization of the habitat by fish, water voles and other vertebrates; and the translocation of river invertebrates including shrimps, nymphs, snails and over 1,000 freshwater mussels (Worrall and Palmer 2005, T5-Inform 2004). The scheme entailed the removal of over 4,500 fish from the 'old' course of the rivers to stock their 'new' diverted courses. The fish removed from the old course included chub, bronze bream, three-spined sticklebacks, eels, dace, roach, pike and perch, but not barbel. There have been no reports of barbel from Bushy Park, and the colonization of the Longford River through Bushy Park, although theoretically possible, remains unlikely.

### GUDGEON *Gobio gobio* (Linnaeus, 1758)

Good populations of gudgeon (Figure 4) are known to be present in the 2.7-km stretch of the Longford River that enters Bushy Park (Mayor of London 2005). This reference provides useful details of the diverse vegetation associated with this 2.7-km stretch of the Longford River and states that:

> 'The river holds good populations of fish, including chub, roach, dace and gudgeon.'

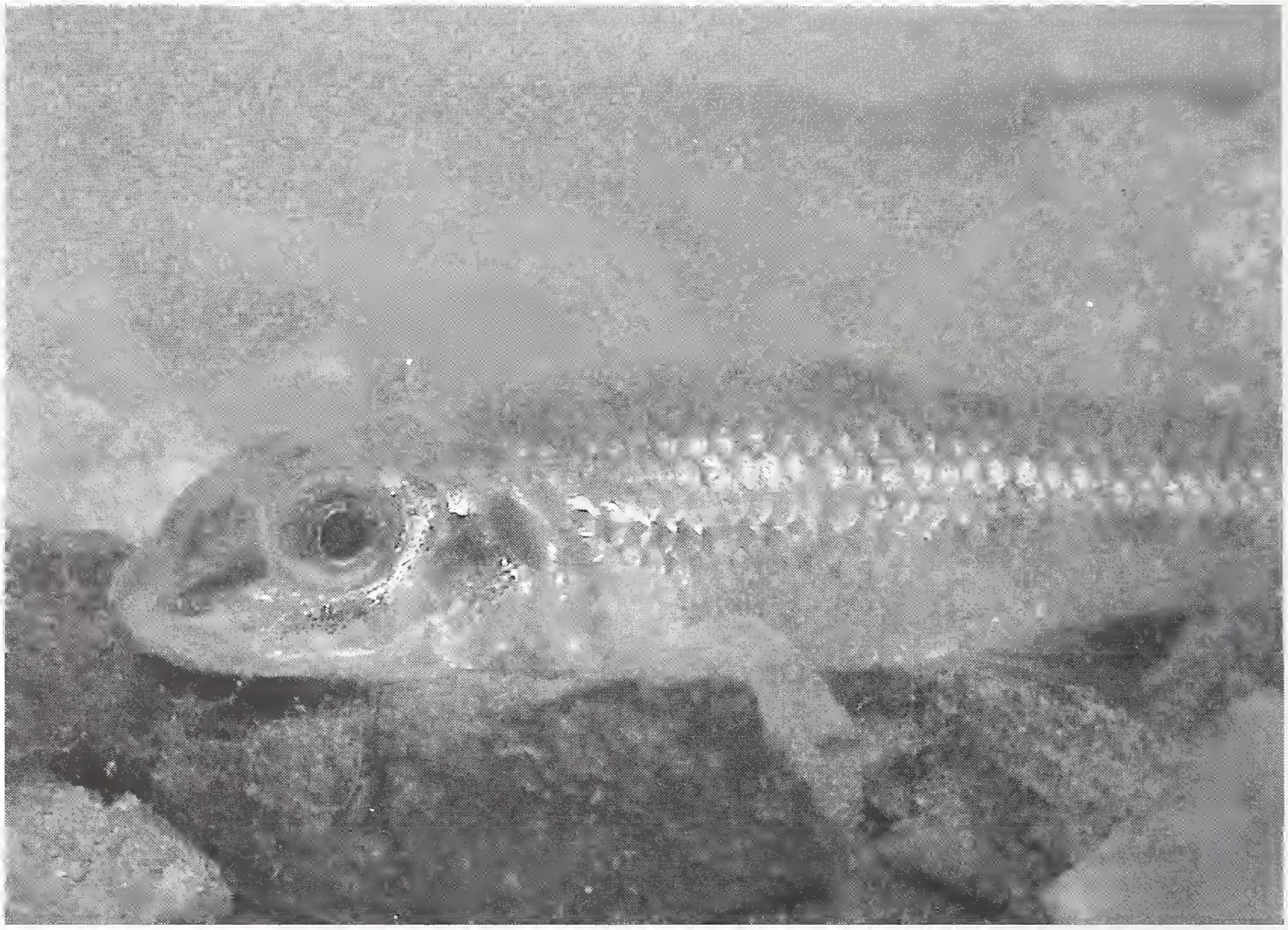

FIGURE 4. Gudgeon are present in the Longford River.

Gudgeon are likely to occur in all stretches of the Longford River in Bushy Park, and have been seen in TQ 1568 and 1569 (John Comfort, pers. comm. 13 May 2008). The native population of this species in the Longford River is likely to be the source of the gudgeon recorded from the Long Water at Hampton Court by Simms (1974: 36).

TENCH *Tinca tinca* (Linnaeus, 1758)
Tench are present in the Model Boating Pond, Heron Pond and Leg of Mutton Pond and the Diana Pond. It has also been recorded ('underyearling carp and tench') from the Boating Pond ditch (LUC report 2005). This species has been recorded from TQ 1569* and 1669.

MINNOW *Phoxinus phoxinus* (Linnaeus, 1758)
There are no records of minnow from Bushy Park. Like the gudgeon, it is present in the River Colne and there remains a possibility of colonization if suitable conditions in the Longford River prevail.

CHUB *Leuciscus* (*Squalius*) *cephalus* (Linnaeus, 1758)
Chub are a common sight in the Longford River and associated water bodies. Notable congregations of large chub can be seen below the Red Brick Bridge (Figure 5) and a large school of chub is present in the Waterhouse Pond. Chub have been recorded from TQ 1469*, 1470*, 1568*, 1569 and 1669.

DACE *Leuciscus leuciscus* (Linnaeus, 1758)
Dace, which appear to be far less frequent than chub in Bushy Park, are present in the Longford River, particularly in faster flowing areas with gravel-based reaches. This species has been recorded from TQ 1469*, 1470 and 1569, but may, like the roach and chub, be present in all stretches of the Longford River in Bushy Park.

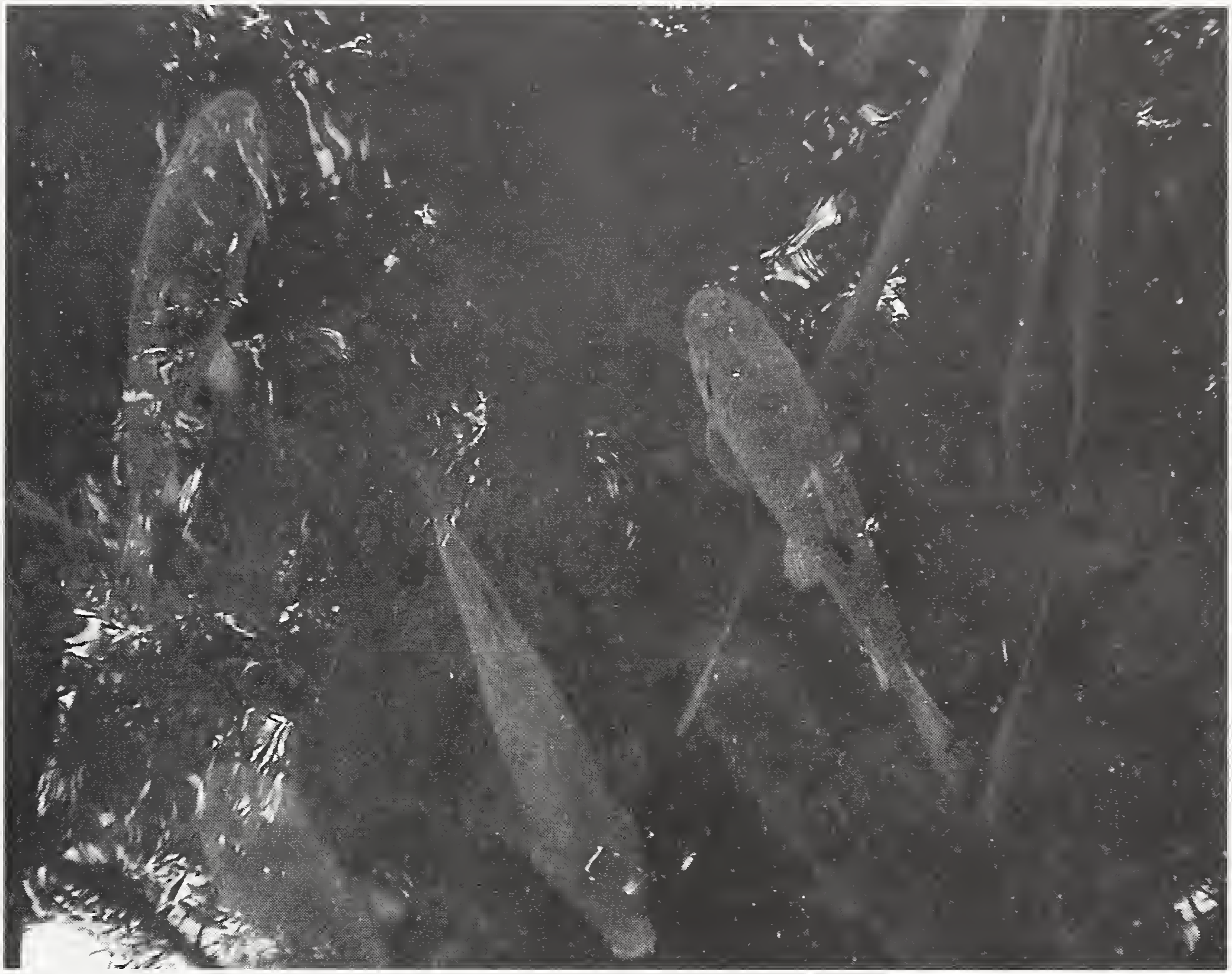

FIGURE 5. Large chub and a carp observed from the Red Brick Bridge.

ROACH *Rutilus rutilus* (Linnaeus, 1758)

Roach are present in the Longford River and its associated water bodies including the Heron, Leg of Mutton and Diana Ponds. This species has been recorded from TQ 1469, 1470, 1568*, 1569 and1669.

RUDD *Scardinius erythrophthalmus* (Linnaeus, 1758)

Rudd are present in a small pond in Silver Birch Glade and also the Heron and Leg of Mutton Ponds. This species has been recorded from TQ 1469 and 1669.

BRONZE BREAM *Abramis brama* (Linnaeus, 1758)

Bronze bream are present in the Heron, Leg of Mutton and Diana Ponds. This species has been recorded from TQ 1569 and 1669.

BLEAK *Alburnus alburnus* (Linnaeus, 1758)

There are no records of bleak from Bushy Park (Simms' (1974) record refers to the Long Water at Hampton Court.)

STONE LOACH *Noemacheilus barbatulus* (Linnaeus, 1758)

The stone loach (Figure 6) is likely to occur in many of the flowing stretches of water in Bushy Park, particularly those stretches with larger gravels, but it is not averse to residing in stiller waters and has been taken by the author from the Leg of Mutton Pond. It can frequently be found (occasionally with bullhead) under stones along the stretch of river that exits the Waterhouse Woodland Gardens at Red Brick Bridge. This species has been recorded from TQ 1469*, 1470, 1568, 1569 and 1669*.

FIGURE 6. The stone loach tends to favour faster flowing stretches of water.

EELS *Anguilla anguilla* (Linnaeus, 1758)

Eels have been recorded in the majority of water bodies in Bushy Park (John Comfort, pers. comm. 2008) and are present in the Heron, Leg of Mutton and Diana Ponds, and the Canal Plantation. The author has recorded this species from the Queen's River before the culvert at the Diana Pond, the stretch of water between the Leg of Mutton Pond and Sandy Lane Gate, and observed an elver caught by pond-dippers at the Heron Pond. The eel has been recorded from TQ 1469, 1470, 1569, 1570 and 1669.

PERCH *Perca fluviatilis* (Linnaeus, 1758)

Perch are present in the Longford River, and the Heron, Leg of Mutton and Diana Ponds. A spectacular sequence of photographs showing a perch being impaled by a heron at (appropriately) the Heron Pond in Bushy Park can be seen on the internet (DigiDylan 2008). This sequence shows the heron chasing a coot from its nest and using the nest as a vantage point to catch the perch. (The fallen tree that provides the backdrop to this sequence was the site where pond-dippers caught the elver described (30 June 2001), and several Chinese mitten crabs, prior to the tree being fenced off for health and safety reasons.) Perch have been recorded from TQ 1469, 1470, 1569 and 1669.

POPE (RUFFE) *Gymnocephalus* (*Acerina*) *cernua* (Linnaeus, 1758)

The pope or ruffe, which, like the barbel, is recorded from the Thames between Richmond Park and Bushy Park, has not been recorded from the waterways of Bushy Park.

BULLHEAD *Cottus gobio* (Linnaeus, 1758)

The bullhead can be found in most stretches of the Longford River where there are stones and gravel for it to hide beneath. Occasionally, some impressively large specimens of this extraordinary fish (Figure 7), which is the only British representative of the Cottidae, can be found under stones in the fast-flowing stream near the Canadian Glade in the Waterhouse Woodland Gardens. The bullhead has been recorded from TQ 1469*, 1470, 1568 and 1569.

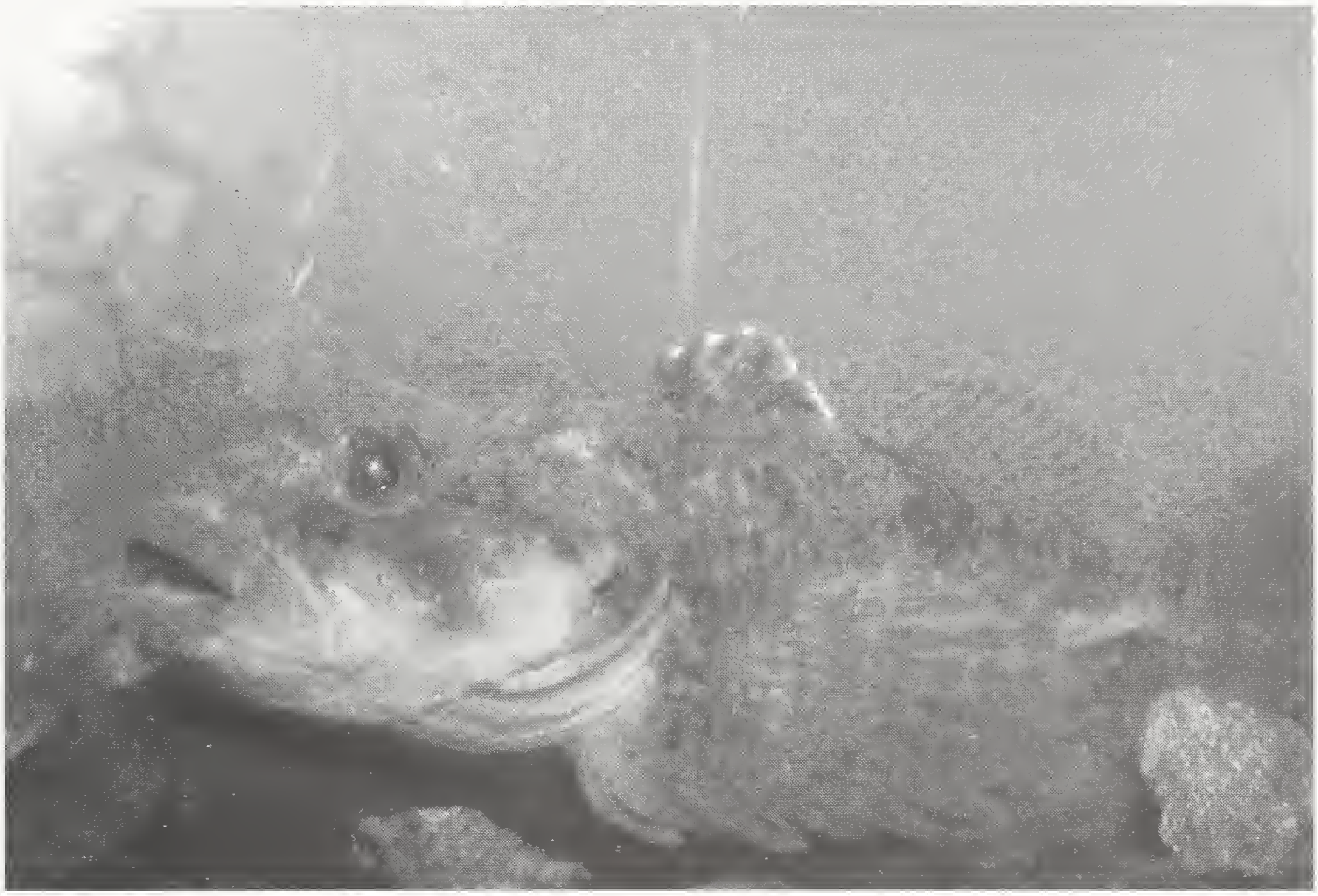

FIGURE 7. The bullhead, like the stone loach, resides under stones by day.

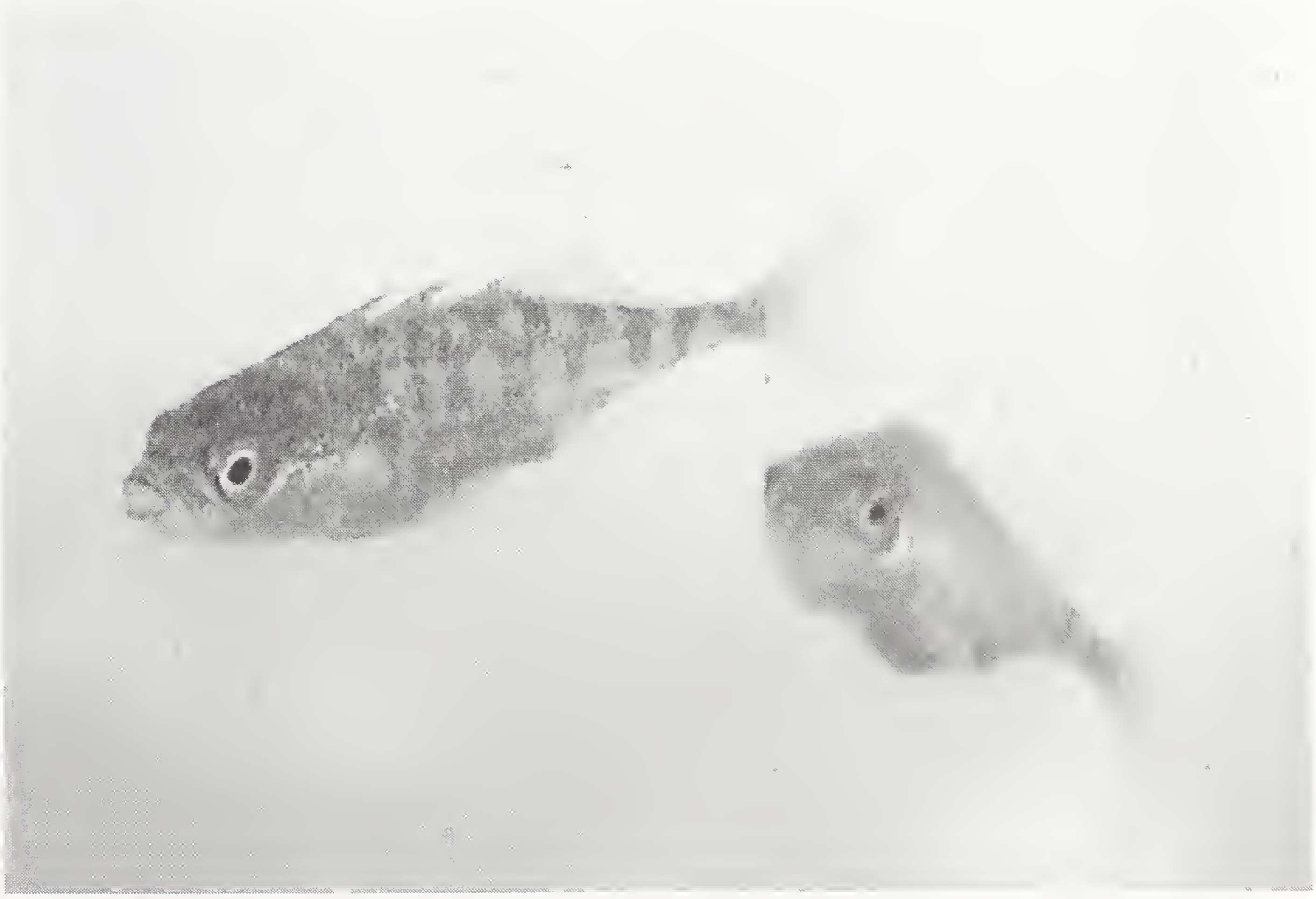

FIGURE 8. Three-spined stickleback, a ubiquitous resident of Bushy Park waters, is an efficient predator of amphibian eggs and larvae.

THREE-SPINED STICKLEBACK *Gasterosteus aculeatus* (Linnaeus, 1758)
The three-spined stickleback (Figure 8) is a very successful and virtually ubiquitous resident of the waterways of Bushy Park. It has been recorded from TQ 1469*, 1470, 1568*, 1569*, 1570* and 1669*.

## Amphibians and reptiles

The 2004 Land Use Consultants (LUC) reptile survey concludes:

> 'In summary, no reptiles were found during the survey, and although this should not be interpreted as meaning that reptiles are absent from the site, it does indicate that reptile populations are likely to be localised and small.'

Incidental records reported from the reptile survey revealed the presence of three species of amphibian (smooth newt, common frog and common toad) in the terrestrial habitats that were studied, and elsewhere in the park, a single positive incidental sighting of a grass snake in the Broom Clumps area of the park was reported on 18 May 2004 (Land Use Consultants 2005).

The LUC aquatic invertebrates survey (Leeming, in LUC report 2005) also reports the incidental presence of the same three amphibians in freshwater habitats across the park.

The ongoing survey by the author (1999–date) has recorded the presence of five of the nine extant species of native reptile and amphibian recorded from the London Area. Additions to literature describe the presence of common frog, common toad, smooth newt, great crested newt, grass snake and a non-native (North American) species, the red-eared terrapin *Trachemys scripta elegans* in Bushy Park (Sutton, 2003, 2006*b*, 2007).

## An annotated checklist of the amphibians and reptiles of Bushy Park

Nomenclature follows Beebee and Griffiths (2000).

COMMON FROG *Rana temporaria* Linnaeus, 1758
The common frog (Figure 9) is common and even abundant in the majority of wetland areas in Bushy Park. Frog spawn and tadpoles are frequently seen in

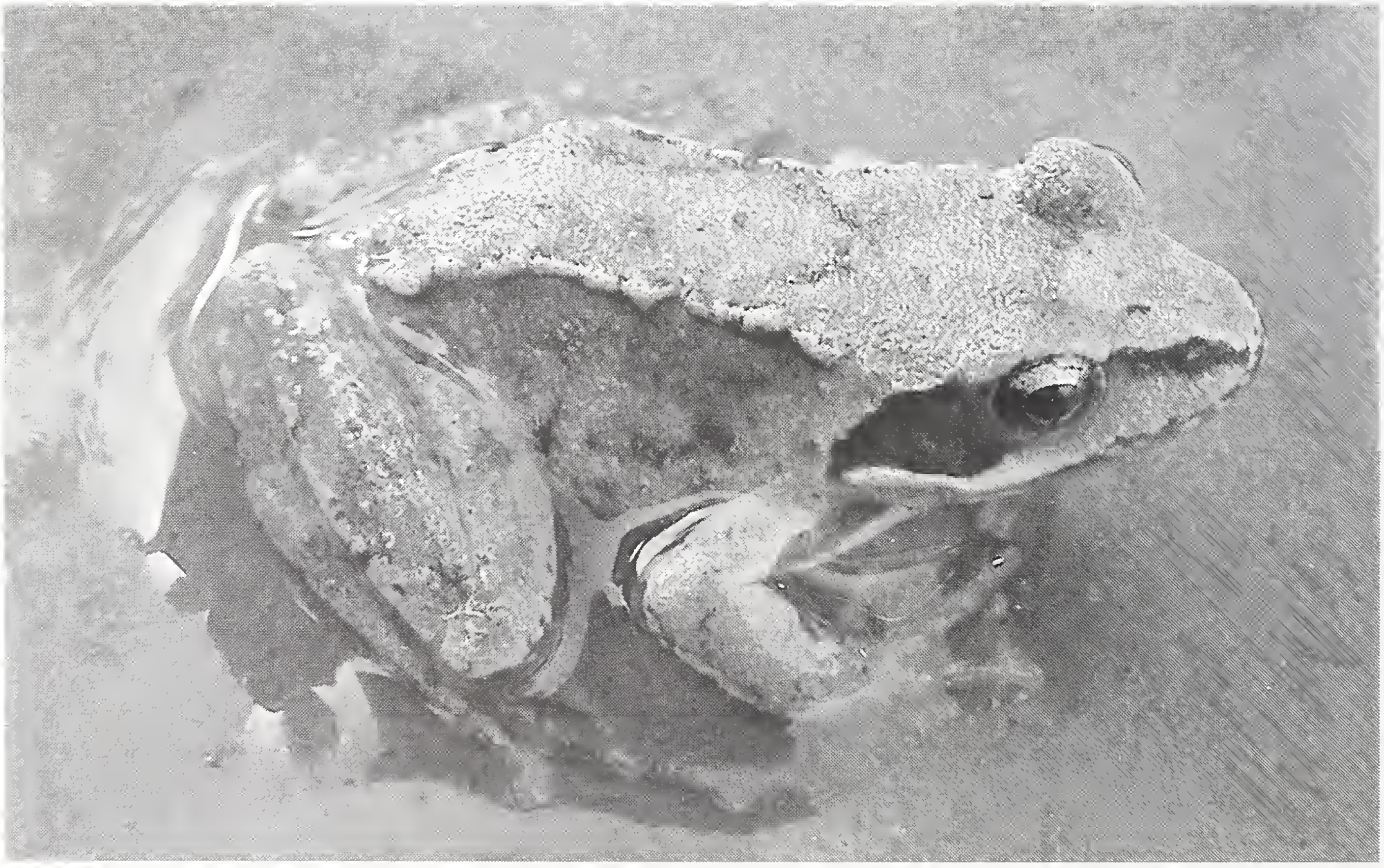

FIGURE 9. The common frog can be abundant in some wetter habitats in Bushy Park.

the Canal Plantation and the Wildlife Conservation area. Newly metamorphosed individuals through to adults can be found in a variety of terrestrial habitats, and are at their most frequent in longer grassland that remains wet or humid for much of the year. This species has been recorded from the following 1-km squares: TQ 1470*, 1570*, 1469*, 1569*, 1669.

WATER FROGS *Rana* (*Pelophylax*) sp.

There have been no further records of water frogs in Bushy Park since they were reported by Wycherley in 1995. The presence of this species in Bushy Park, which was likely to have resulted from the release of a confiscated consignment of frogs from Turkey at Heathrow (Wycherley 2003), appears to have been a transient occupation.

COMMON TOAD *Bufo bufo* (Linnaeus, 1758)

The common toad (Figure 10) is probably less frequent than the common frog and smooth newt, but remains common throughout the park. Terrestrial phase adults are particularly fond of damp deadwood habitats. The wetland area to the north of the Heron Pond appears to be a frequent spawning site and the jet black tadpoles thrive in its shallow waters (Figure 11). On one occasion (1 May 2005) the author observed several leeches *Erpobdella octoculata* which appeared to be actively pursuing these toad tadpoles, but saw none caught. It is recorded from TQ 1470*, 1570*, 1469*, 1569*, 1669*

NATTERJACK TOAD *Bufo bufo* Laurenti, 1768

The natterjack toad, a species now long lost from the heathy districts of Greater London, was formerly recorded from sites within the Ham radius, although there are no historical records from the Bushy Park area.

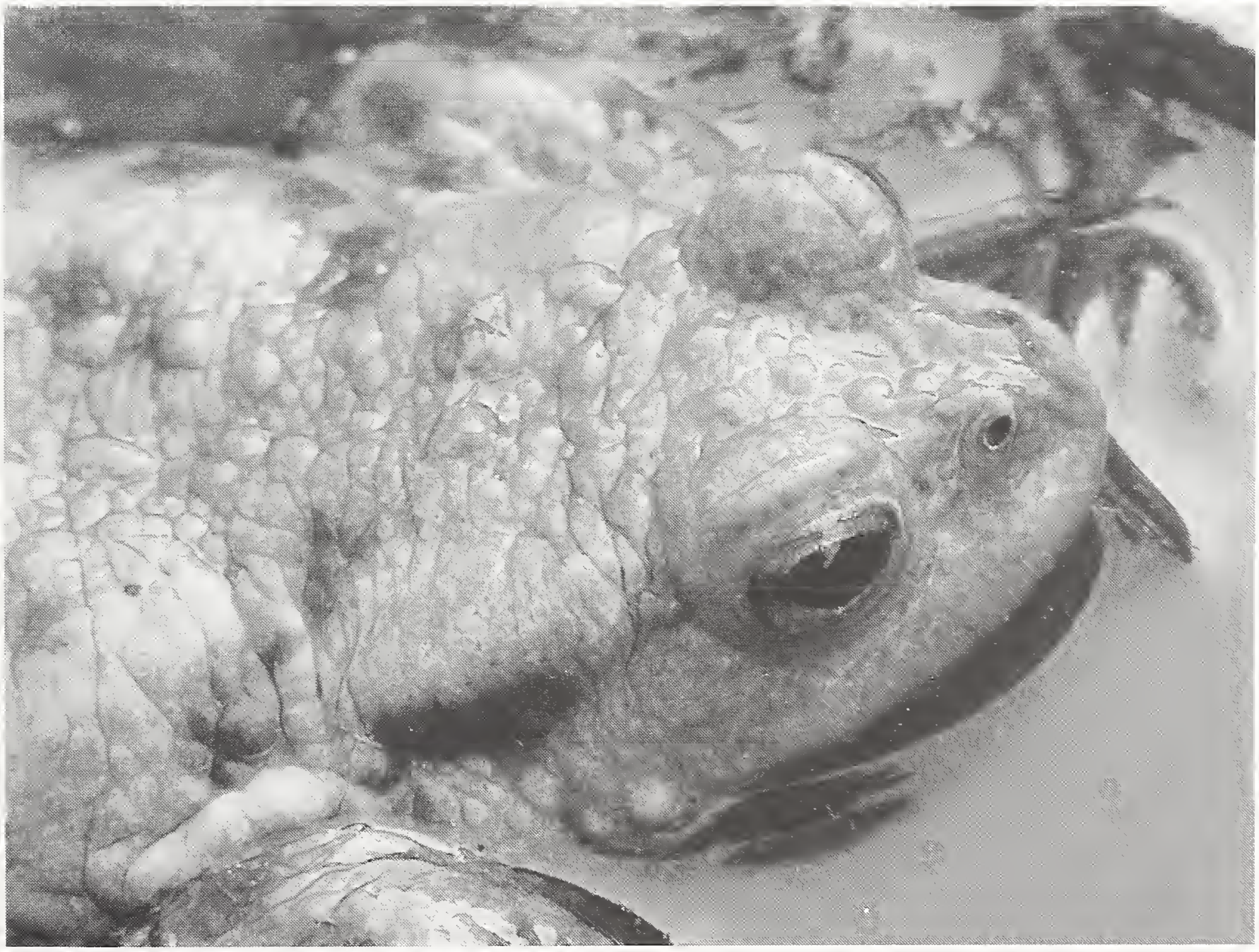

FIGURE 10. The common toad is frequently found under dead wood and leaf litter in Bushy Park.

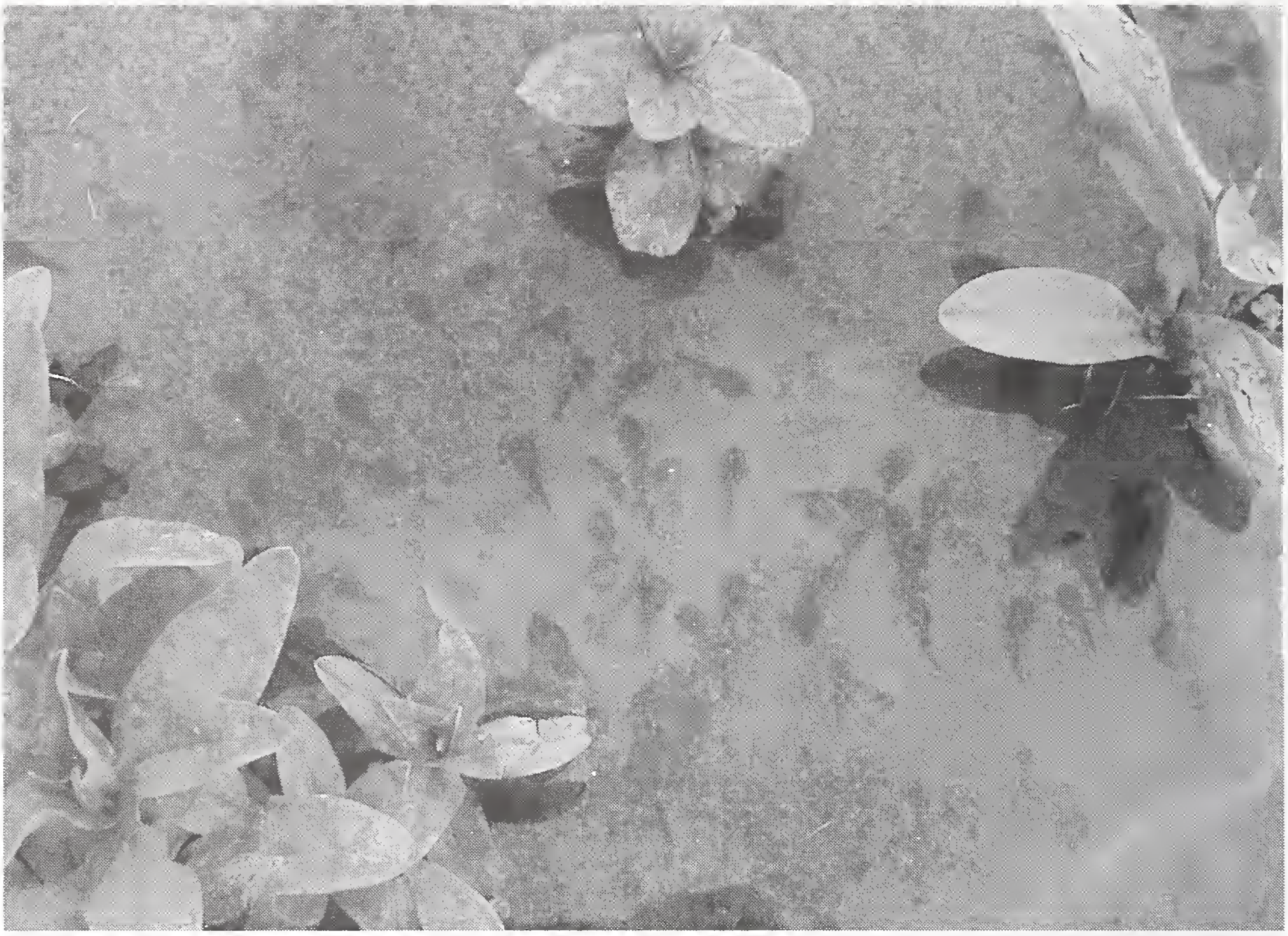

FIGURE 11. Common toad tadpoles can be abundant in the wet marshy area on the northern bank of the Heron Pond.

FIGURE 12. Two courting great crested newts were observed and photographed next to this water vole platform in a warm shallow pond which was teeming with common frog tadpoles and invertebrates.

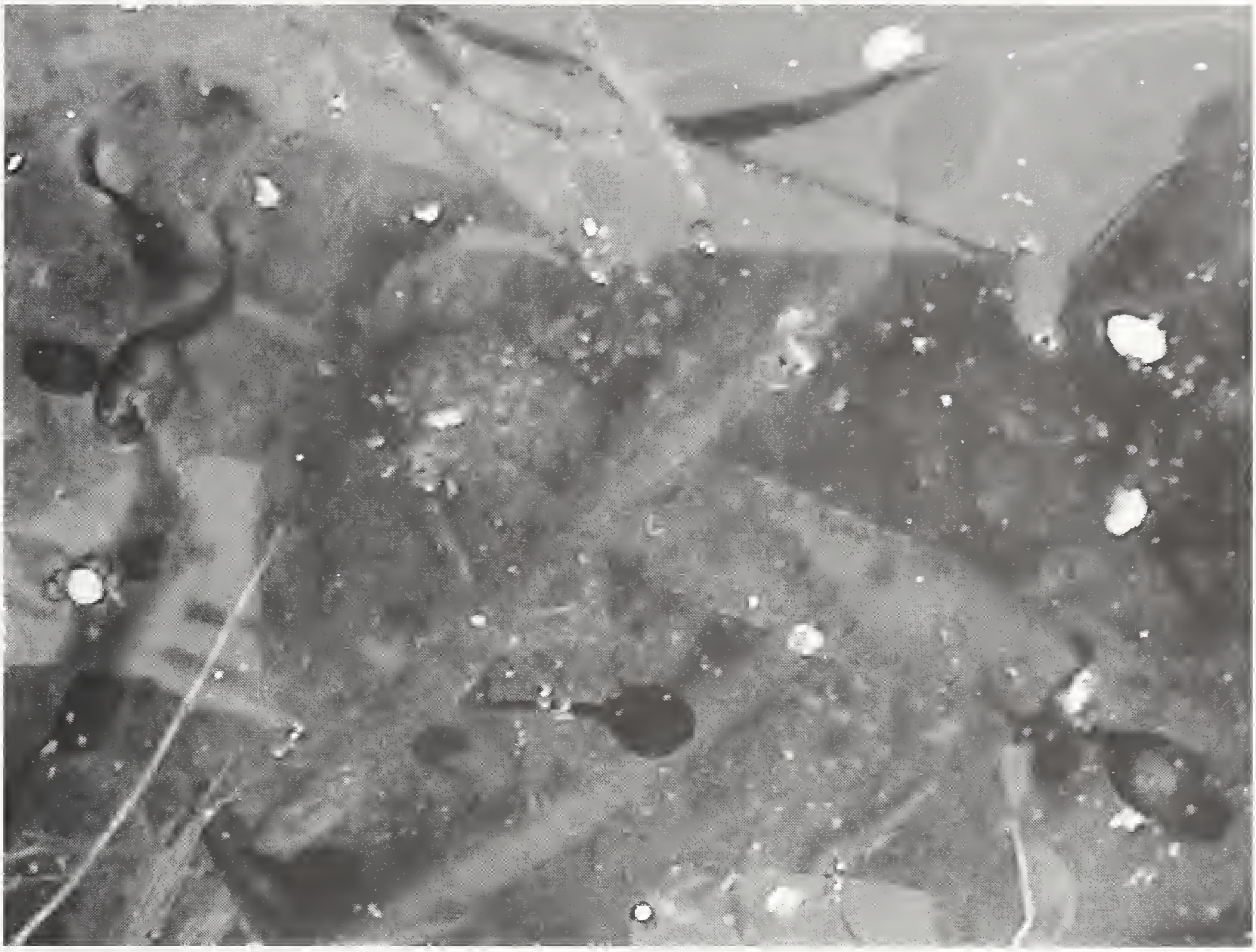

FIGURE 13. A male great crested newt is just visible among the tadpoles.

## GREAT CRESTED NEWT *Triturus cristatus*[3] (Laurenti, 1768)

A single terrestrial phase female was found by the author in damp conditions under dead wood in the Canal Plantation (TQ 1470/1570) on the morning of 5 July 1999. John Comfort (pers. comm. 8 May 2008) remembers finding what he thought were many great crested newts at this site (which in the intervening decades has become well shaded by bankside trees and vegetation, and prior to recent netting, contained a large population of carp *Cyprinus carpio*), specimens of which he considered to be 'much larger than the average newt'. Almost a decade later, again by chance whilst investigating a water vole platform (Figure 12) in the late afternoon of 14 April 2007, two more adults were seen and photographed by the author: a male in full breeding attire (Figure 13) courting an egg-bound female in a pond teeming with frog tadpoles and other aquatic life (TQ 1469).

In addition to the observation of adults, a single great crested newt larva was recorded incidentally during a survey of Chinese mitten crabs on 30 June 2001 (TQ 1669) but was immediately returned without formal identification, and must therefore be regarded as provisional, the record reading: 'Newtlet, great crested, too big to be anything else'. The newt larva was found whilst investigating bankside vegetation which also contained water snails (*Planorbis* sp.) lesser water boatmen (*Sigara* sp.), water shrimps *Gammarus pulex* and water hog lice *Asellus aquaticus*.

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[3] This species, which is generally referred to as the great crested newt in Britain (although some authors, e.g. Langton, refer to it simply as the crested newt), has been the subject of molecular analysis, and together with crested newts which were formerly recognized as subspecies, has been taxonomically separated on the basis of differences in protein and DNA (Arnold and Ovenden 2004). Accordingly, the 'northern crested newt' has been separated from southern and south-eastern European species, i.e. the Italian crested newt, Balkan crested newt and Danube crested newt. All four species are capable of interbreeding successfully. (It should be noted, however, that although viable, the hybrid progeny apparently suffer from reduced fertility which ultimately results in a failure of the hybrid population to propagate itself (Beebee and Griffiths 2000). This is perhaps borne out by the work of Brede et al. (2000) who used a multivariate morphometric analysis to show that after sixty years, in spite of the fact that there was opportunity to do so, *Triturus cristatus/carnifex* hybrids had failed to colonize suitable habitat away from the original site of the still prospering *T. carnifex* introduction in Surrey.) It is likely that the smooth newt, whose regional European forms are represented by subspecies which are phenotypically very distinct (arguably more so than *Triturus* spp.), will probably undergo a similar treatment in due course.

The discovery of a courting pair of adults by the author in 2007 indicates that great crested newts are still attempting to breed in Bushy Park. There is plenty of aquatic vegetation for the adult females to lay eggs at this site, and Green (2001) provides the following information:

> 'The egg-laying period for great crested newts ranges from late February to July. The females lay principally between early evening and early morning, and the number of eggs laid daily is temperature-dependent. In a garden pond studied in detail by the author, the pregnant females laid only two eggs per day in mid March, rising to six per day a month later, and averaging nine per day by mid May. Early–mid June is presumed to be the peak egg-laying period.'

Green also states that the eggs of great crested newt eggs tend to be laid on healthy plants with broad green leaves and provides a list of known plants used for egg-laying. It is perhaps this protracted egg-laying behaviour, together with sufficient aquatic plant cover, which decreases the chance of egg mortality through single-event predation and has allowed the great crested newt to persist in Bushy Park in fish inhabited environments[4].

In 1996, it was reported that over 40 per cent of great crested newt populations are believed to have been lost from the London Area since 1975, and it was recognized that the introduction of fish was a crucial factor in the disappearance of crested newts from a site (Atkins and Herbert 1996).

The water bodies associated with all observations of the great crested newt in Bushy Park support healthy populations of fish. One of the water bodies, the Canal Plantation, was recently seine netted to remove a large population of carp for the benefit of amphibian, including newt, populations. However, it is well-known that seine netting is not an effective method for the capture of smaller species (Perrow and Jowitt 2000) and is both unlikely to have revealed the presence of great crested newts in the water body, or removed their most serious predator, which is not carp, but apparently, the three-spined stickleback. Atkins and Herbert (1996), during their study of great crested newt populations, and the subsequent assessment of the status of this species in Greater London stated that, 'No colonies were found in waters where sticklebacks were present and these appear to cause rapid extinction. Some crested newts were found to survive at a few sites with carp Cyprinidae present.' In this respect there is an obvious question which arises regarding the abundance of the smooth newt in equally stickleback-inhabited waters, and Beebee and Griffiths (2000) provide the following explanation:

> 'The behaviour of crested newt larvae is characteristic during the later stages of development. Unlike the smaller species which stay well hidden on the bottom of the pond or amongst vegetation, crested newt larvae swim or drift freely within the water column. Indeed, they seem to be able to maintain a mid-water position without any movements of the limbs or tail. As adult crested newts are predominantly bottom-dwellers this nektonic existence of larvae presumably reduces the risk of cannibalism. On the down-side, however, such behaviour makes them more vulnerable to fish and probably explains why crested newts rarely do well in fish ponds.'

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[4] A fascinating point is made by Beebee and Griffiths (2000) regarding the hatching success of great crested newt eggs: 'Half of all crested newt eggs fail to hatch as a result of a curious developmental problem associated with their chromosomes (Horner and Macgregor, 1985). Newt cells carry 12 pairs of chromosomes, but the two in pair number 1 (1A and 1B) differ from each other in structure. If a prospective embryo receives two dissimilar chromosomes, i.e. 1A from the male and 1B from the female, or vice versa, development proceeds normally. If, however, the male and female both contribute chromosomes of the same type (i.e. both 1A or 1B) the embryo aborts at the tail-bud stage and dies. As there is a 50 % chance of either type of chromosome entering a sperm or an egg there is also a 50 % chance that the fertilized egg will carry two chromosomes of the same type. Consequently, half of the eggs will always abort.'

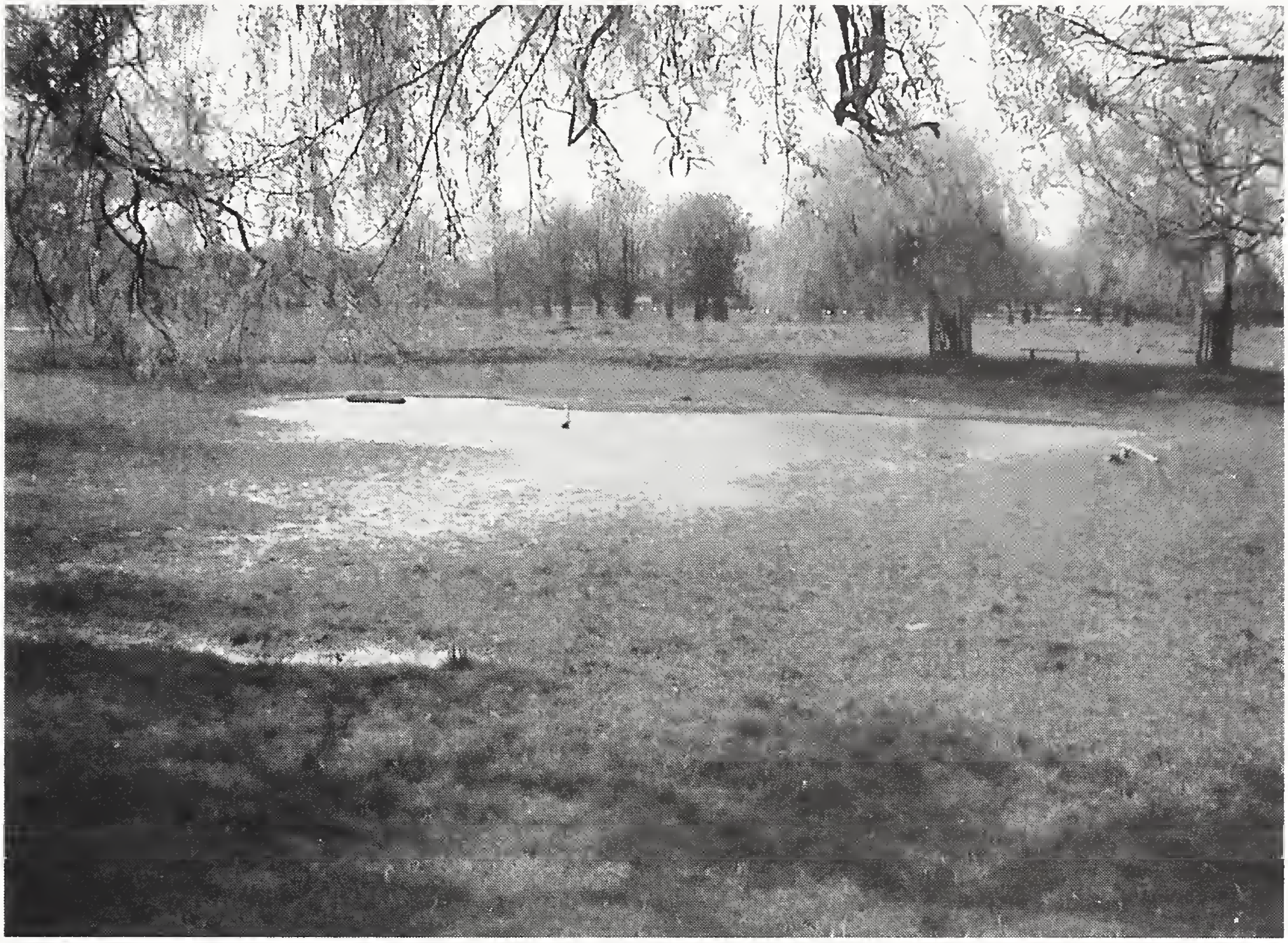

FIGURE 14. The ephemeral Hampton Hill Pond provides a good indication of water table levels in Bushy Park.

This again raises questions regarding the historical status of crested newts within the park boundaries. Has the recent prosperity of freshwater fish populations in Bushy Park made possible breeding sites less suitable, or even unsuitable for breeding success? Certainly, the site where the adult male and female were photographed by the author in 2007 is permanently fed by the Longford River and has a fish population which includes carp and sticklebacks. This site would greatly benefit from being isolated from the main river flow, and also being allowed to dry out occasionally to remove fish predators.

The author has noted that virtually all of the water bodies in Bushy Park have populations of the three-spined stickleback (including the Canal Plantation (e.g. Sutton 2006*b*), where this species was not recorded during the 2004 LUC survey), and the only fish-free water body likely to support a great crested newt breeding attempt, Hampton Hill Pond (Figure 14) has to date, only revealed the presence of smooth newts. However, in accordance with the list provided by Green (2001), this temporary pond does support plants which are used by this species for egg-laying when it contains water.

Regarding its current status, it would appear that that while there may be great crested newts attempting to breed in Bushy Park, conditions do not appear to favour the long-term survival of this low-density population, owing to a lack of suitable fish-free breeding environments.

### SMOOTH NEWT *Triturus* (=*Lissotriton*) *vulgaris* (Linnaeus, 1758)

The smooth newt (Figure 15) is common in aquatic and terrestrial habitats in Bushy Park and has been recorded from TQ 1469*, 1470*, 1569*, 1570, 1669*. This species has been recorded at all stages of its life-cycle in still and running water habitats across the park. The distribution maps provided by Langton (1991) clearly show increase in recorder effort since 1980, where there were no pre-1980 1-km records for this species from Bushy Park.

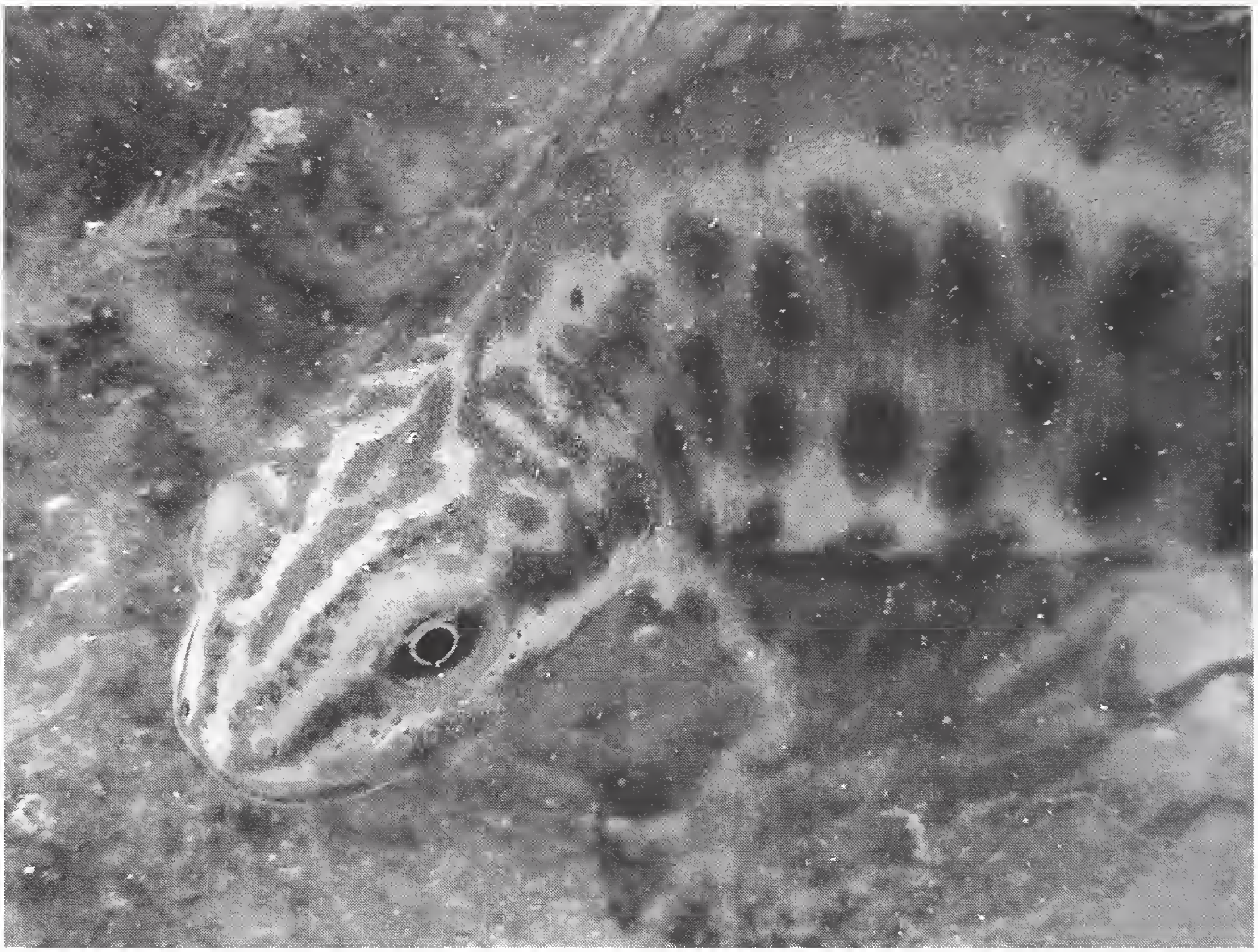

FIGURE 15. A male smooth newt eating an insect larva.

PALMATE NEWT *Triturus helveticus* (Razoumowsky, 1789)
There are no modern or historical records for this species from Bushy Park.

SLOW-WORM *Anguis fragilis* Linnaeus, 1758
The LUC report (2005) states that:

> 'The Park's managers and wildlife officer are aware of the presence of reptiles (grass snakes and slow-worms) in certain locations across the Park', and that 'observations of slow-worm are reported from the Nature trail/Pixie Mead area.'

Since 1999, the author has searched for this species, without success, and conversations with experienced Royal Park staff indicate that there have been no confirmed sightings of this species in the park (John Comfort, Ray Brodie, pers. comm. 8 May 2008). Although it is not impossible that a population of slow-worms may exist within the park boundary, it is highly unlikely, and if this species was ever recorded from Bushy Park, it is now likely to have been lost from the park fauna.

COMMON or VIVIPAROUS LIZARD *Lacerta* (=*Zootoca*) *vivipara* Von Jacquin, 1787
The LUC report (2005) concludes that:

> 'although no observations have been reported it is possible that common lizard *Lacerta vivipara* may occur in select locations within the Park on the basis that apparently favourable habitat conditions for these species persist, namely semi-natural woodland, rank grassland and scrub habitats that are not subject to regular grazing or mowing management occur.'

The author has searched for this species since 1999 without success. There are no modern or historical records for the common lizard occurring in Bushy Park, and any historical presence would certainly have been pressurized by the

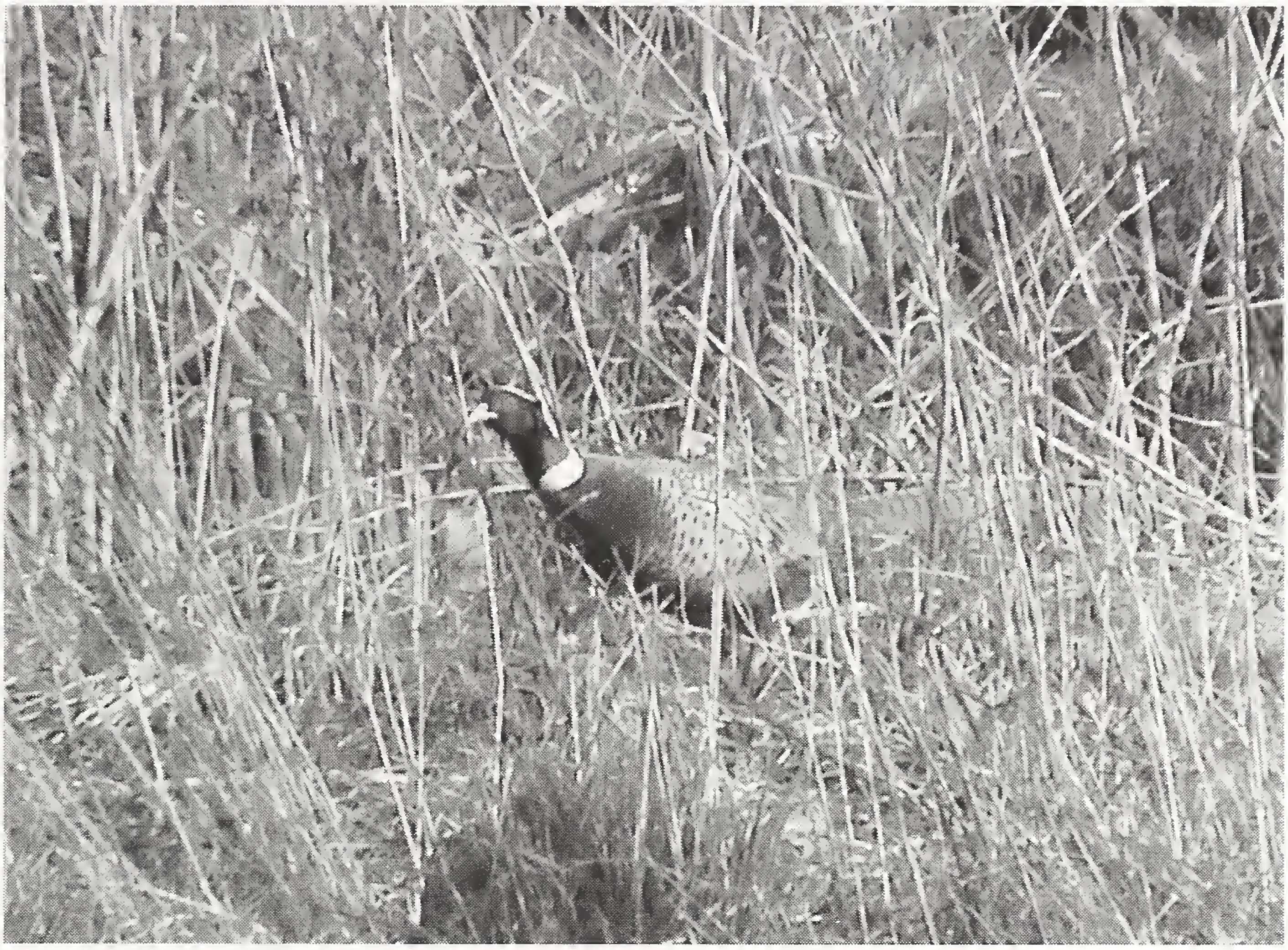

FIGURE 16. Pheasants, an efficient predator of reptile populations, patrol the woodland edges in less-disturbed areas on the western side of Bushy Park.

presence of game birds. Pheasants (Figure 16) in particular are noted for their predation of reptiles (e.g. Sheldon 2004). The historical status of this species remains unclear. If it was ever present, the common lizard has almost certainly been absent from Bushy Park for many years.

### SAND LIZARD *Lacerta agilis* Linnaeus, 1758

Arnold (1995) and Beebee and Griffiths (2000) indicate the former presence of this species at heathy sites in the London region, but as for the natterjack toad, there are no historical records of this long-lost species from the Bushy Park region.

### GRASS SNAKE *Natrix natrix helvetica*[5] (Lacépède, 1789)

The LUC report (2005) states that:

> 'Grass snake has been confirmed occurring in the Broom Clumps (one adult snake) and possibly also use the Water Gardens. It is also possible that the large leaf litter and grass cutting compost heaps in the Broom Clumps are used by grass snake for egg-laying and hibernation. However, the extent to which these features are used by snakes and/or are suitable in terms of how disturbed they are during critical periods of the snake's lifecycle is not known. It is of note, however, that grass snakes are not entirely dependent on compost heaps for egg-laying and will use a variety of other underground features provided they are humid and warm (for egg-laying) or provide reasonably constant humid conditions during the winter hibernation period.'

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[5] This subspecies was described by Fitter (1949) as *Natrix natrix natrix* L., which is a north and north-eastern subspecies (as shown by Arnold and Ovenden 2004) and according to Morrison, has its western boundary as the Rhine Valley (Morrison 1994). The British subspecies is *Natrix natrix helvetica*. There has been some disagreement regarding the number of European subspecies of *Natrix natrix*, with up to twelve being described. Thorpe (1984) recognizes only four: the western (*N. n. helvetiva*), eastern (*N. n. natrix*), Corsican (*N. n. corsa*), and Sardinian (*N. n. cetti*). Arnold and Ovenden (2004), while acknowledging this grouping, provide useful details regarding the identification of the characteristic regional forms of twelve named subspecies (including those which, like *corsa* and *cetti*, have evolved on islands) which would otherwise be regarded simply as *N. n. helvetica* or *N. n. natrix*.

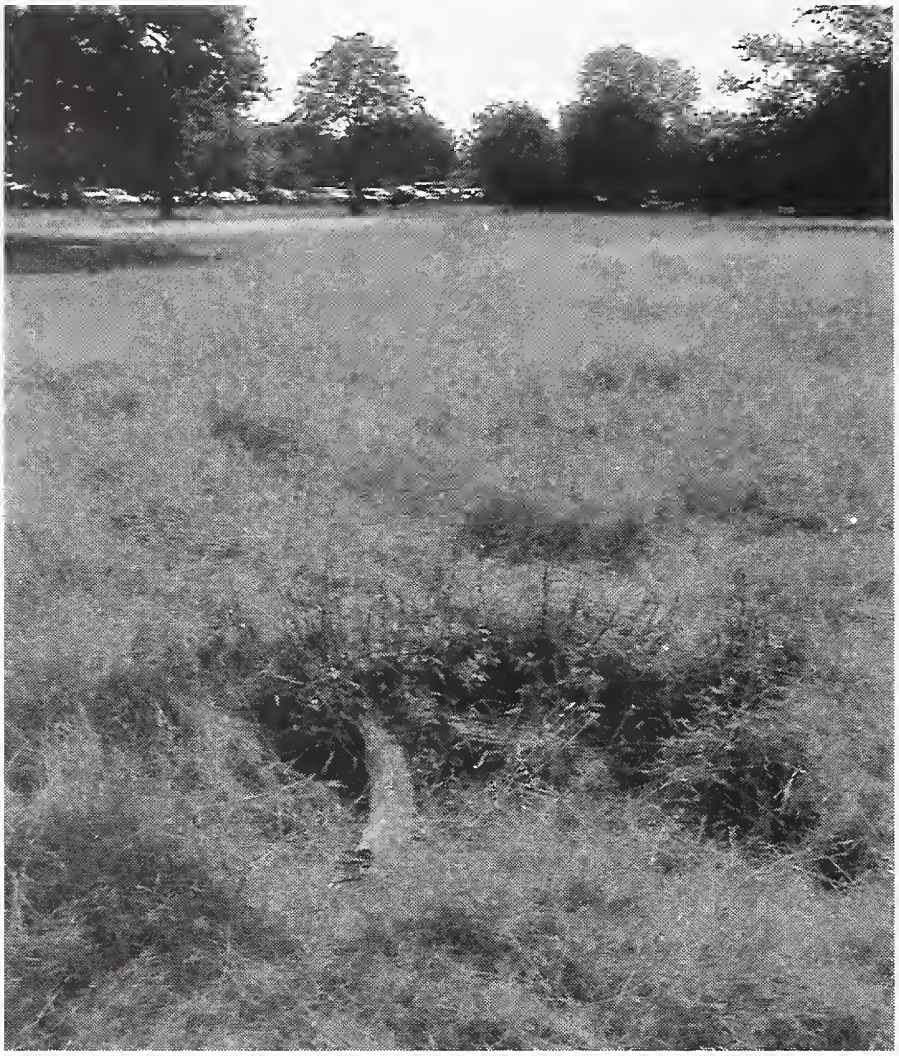

FIGURE 17. This now degraded stump, which regularly produced sightings of grass snakes, was possibly a favoured egg-laying site or hibernaculum.

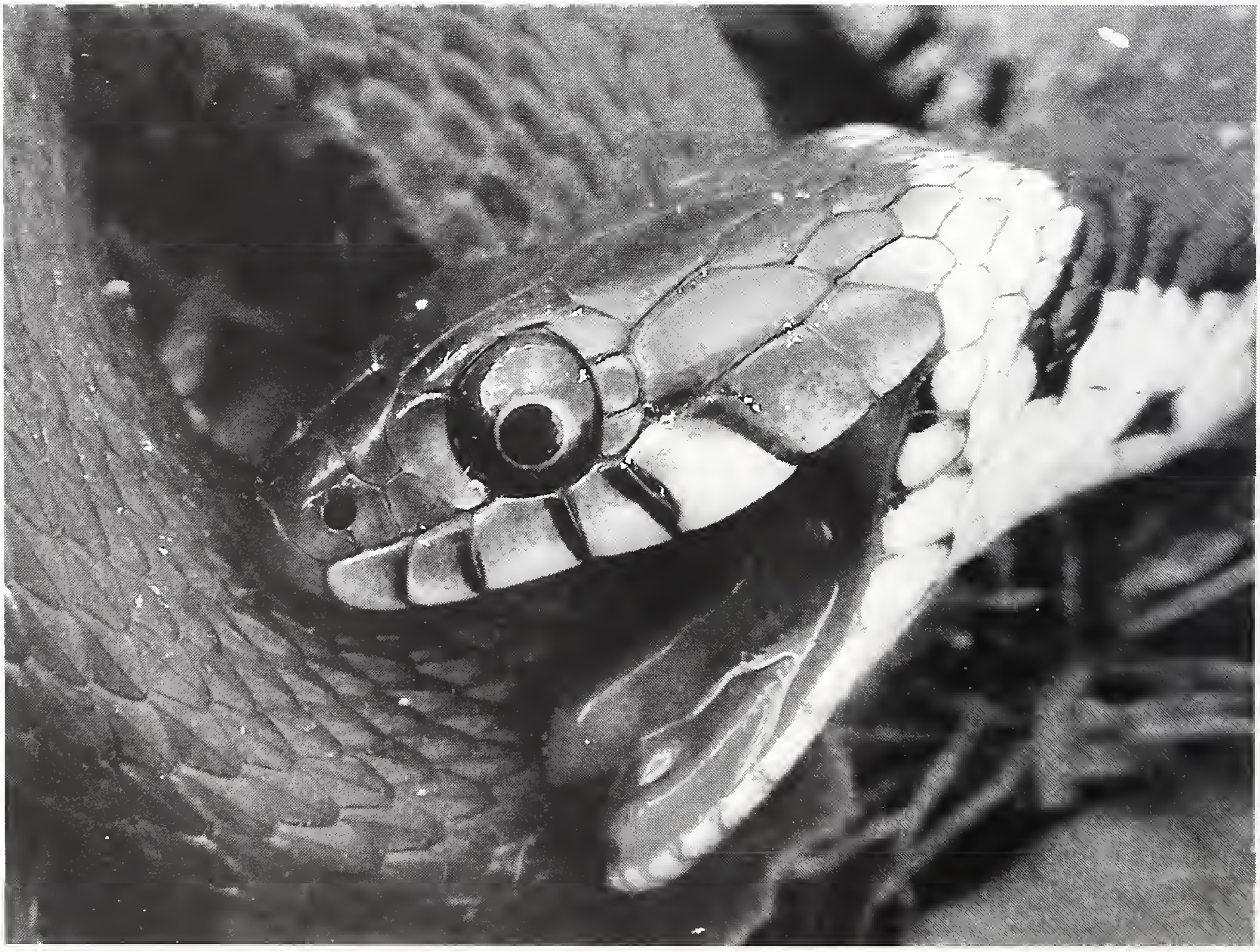

FIGURE 18. A Bushy Park grass snake exhibiting typical death-feigning behaviour.

Regarding this last point, it is likely that a large oak stump (Figure 17) that was formerly present near the Barrack Gate entrance was used for this purpose, as indicated in the following extract (Sutton 2007):

> 'Walking north from Barrack Gate, I revisited an old oak stump to the left of the dirt track, which, having been occupied by many stag beetle *Lucanus cervus* and other saproxylic beetle larvae, had been reduced to nothing more than a hollow depression filled with nettles. It always surprised me that the stump was previously a regular haunt for grass snakes *Natrix natrix*, being some distance away from their usual aquatic habitat. Doubtless it provided, in addition to being a fine basking area with immediate shelter from predators, either a good site for hibernation or a suitably warm location for the successful incubation of eggs.'

In the light of comments by Langton (1991) who concluded that:

> 'It would seem likely however that in Greater London there are less than 10 places where habitats fulfil the needs of grass snakes and less than half this number have much long-term potential',

it is clear that Bushy Park represents a site of significant importance for the grass snake in Greater London. The population, which has an ample food supply and some areas of suitable habitat, appears to be fairly healthy with regular (and occasionally multiple) sightings by the author in less-disturbed habitats on the western side of the park, and also records from the Broom Clumps area where a number of adults have been recorded (John Comfort, pers. comm. 8 May 2008).

In Bushy Park, the grass snake (Figure 18) has been recorded from TQ 1469, 1470, 1569 and 1669*.

With careful protection of habitat, particularly those areas which represent suitable egg-laying sites or potential hibernacula, the future of the grass snake in Bushy Park could be assured.

### ADDER OR NORTHERN VIPER *Vipera berus* (Linnaeus, 1758)

It is highly likely that all unverified reports of adder sightings in Bushy Park are attributable to grass snakes (Ray Brodie, pers. comm., 8 May 2008). Langton et al. (2005) state that:

> 'a viable adder site-size for 100 snakes might be 25 hectares.'

Although there are respectable numbers of small mammals in the park to support this species (e.g. LUC report 2005, Reeve et al. 2001), in view of the habitat requirements of this species and the available site size, Bushy Park does not appear to have the capacity to support a viable adder population (Tom Langton, pers. comm. 2007).

As would be the case for the common lizard, if a population was present at any point in the park's history (when it would presumably have been subject to persecution), it has long since disappeared from the site.

### RED-EARED TERRAPIN *Trachemys scripta elegans* (Weid, 1838)

A single large specimen of the red-eared terrapin (Figure 19) was recorded regularly from a drainage ditch near Fisher's Pond (TQ 1469) from 1999 until late summer 2001, and since no observations have been made at this site or adjacent waterways since that date, it is possible that the specimen either died from unknown causes or was taken from the site.

A conversation with a park worker in 2000 revealed that there had formerly been several red-eared terrapins that had been introduced to the site by an unknown party, and that they had been seen in the general area surrounding Fisher's Pond for at least ten years.

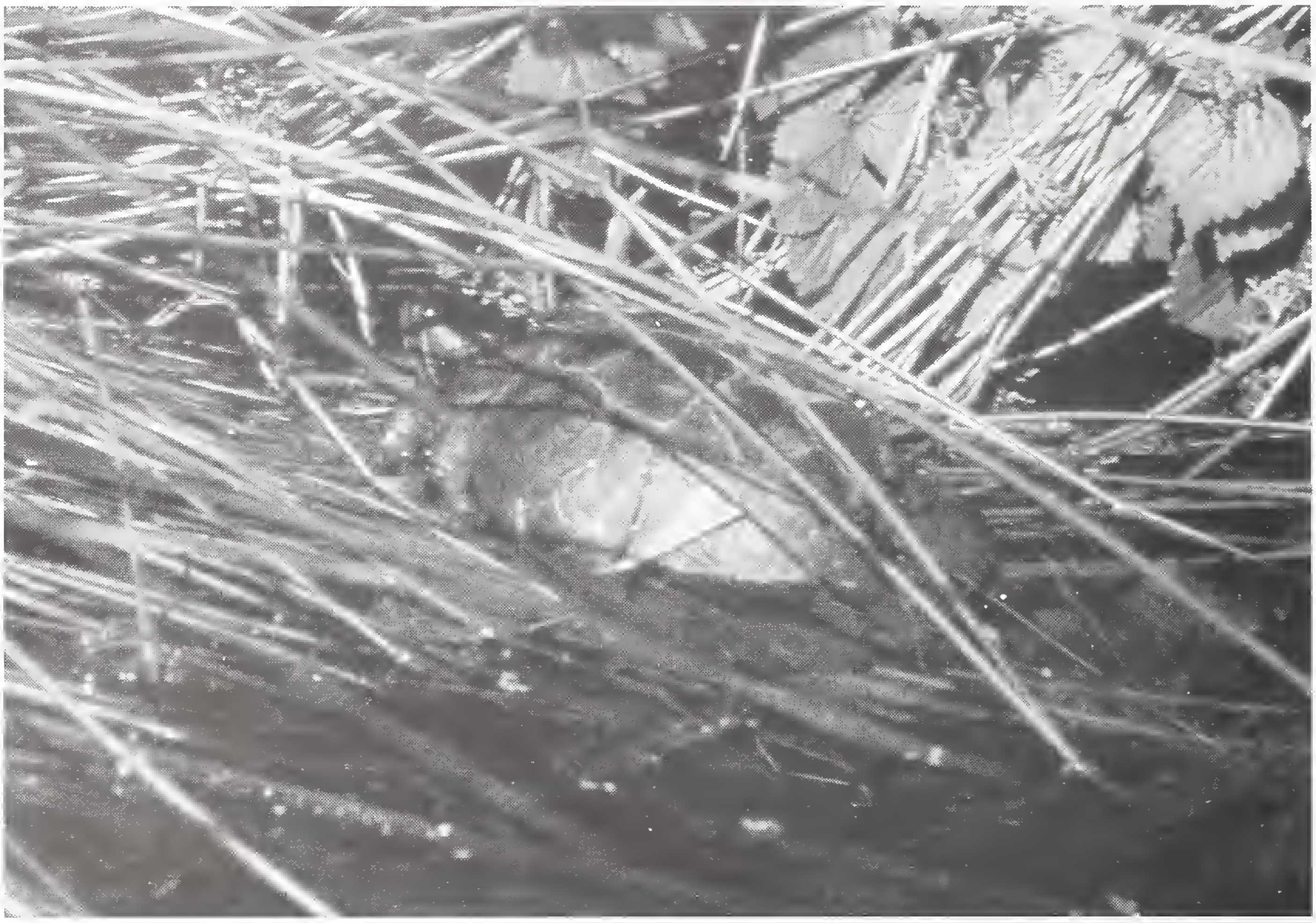

FIGURE 19. Red-eared terrapin sunbathing on the bank of a drainage ditch near Fisher's Pond.

## Current threats to the fishes, amphibians and reptiles of Bushy Park

There are a number of threats to the fish, amphibian and reptile populations of Bushy Park which can be summarized in terms of both habitat change and predation.

Positive habitat changes that may affect species in Bushy Park arise from the management of the park and its habitats, for instance, the creation of new wetland habitat in the Brewhouse Meadows. However, negative changes may occur as a result of pollution, or the impact of undesirable alien species in the park.

The main threat from pollution arises from the potential influx of nutrients from the Maple Lodge Sewage Treatment Works, which releases a large volume of treated effluent that eventually travels through the waterways of Bushy Park on its way to the Thames. It is clear that improvements in waste treatment have been responsible for the improved water quality in the region, but at times of low river flow, particularly in summer, deteriorations in water quality may still have an adverse effect on the aquatic flora and fauna of Bushy Park. It is clear that the River Colne and its tributaries will remain under threat from potential incidents along its course for the foreseeable future. A measure of this threat is exemplified by the fact that legal unit of the ACA (Anglers' Conservation Association 2005) was investigating over fifty legal cases concerning river and fish stock damage caused primarily by sewage pollution (including farm slurry waste), and agricultural and industrial discharges into waterways, including a recently resolved case concerning the pollution of the River Colne by a quarry operator on October 2002. In this instance, it was reported that:

> 'In October 2002, a stretch of the River Colne in Middlesex was grossly polluted by a quarry operator. The river ran red with silt . . . . Faced with a legal challenge from the ACA, the polluters have settled the claim without a fight . . . .' (ACA 2005).

Regarding the matter of habitat change caused by non-native species, there are two invasive alien species, the Chinese mitten crab *Eriocheir sinesis*, and the American signal crayfish *Pacifastacus leniusculus* that have the ability significantly to alter the nature and ecological balance of the habitats that they invade. Both species are capable of migrating long distances across land to colonize new sites, and both are likely to have an impact on the aquatic biodiversity of Bushy Park.

The Chinese mitten crab (Figure 20) is already present in the water bodies of the park. It is an omnivorous predator, whose impact on the amphibian and fish populations of Bushy Park is as yet unknown, but it is believed that through predation and competition for resources, as well as its nutrient releasing and habitat altering burrowing activities (which may also have an impact on plant diversity), its presence may become increasingly detrimental. This species spends four or five years upstream in fresh water, and must return to the saline waters of the Thames Estuary to reproduce. It is a measure of the ability of this species to migrate to and from the estuarine environment that it can be found so far upstream. As previously mentioned (in accordance with studies of this species in China), it has the ability to invade the entire Thames catchment area, and has certainly spread as far as the River Colne at Staines, 63 km from the sea (Marine Biological Association 2007). After many decades of being rarely and sporadically recorded in Britain, the population of Chinese mitten crab increased markedly in the 1990s, and it is believed that this species, which has been placed on the IUCN list of the World's one hundred worst alien species, is capable of infesting all of the Thames and its tributaries.

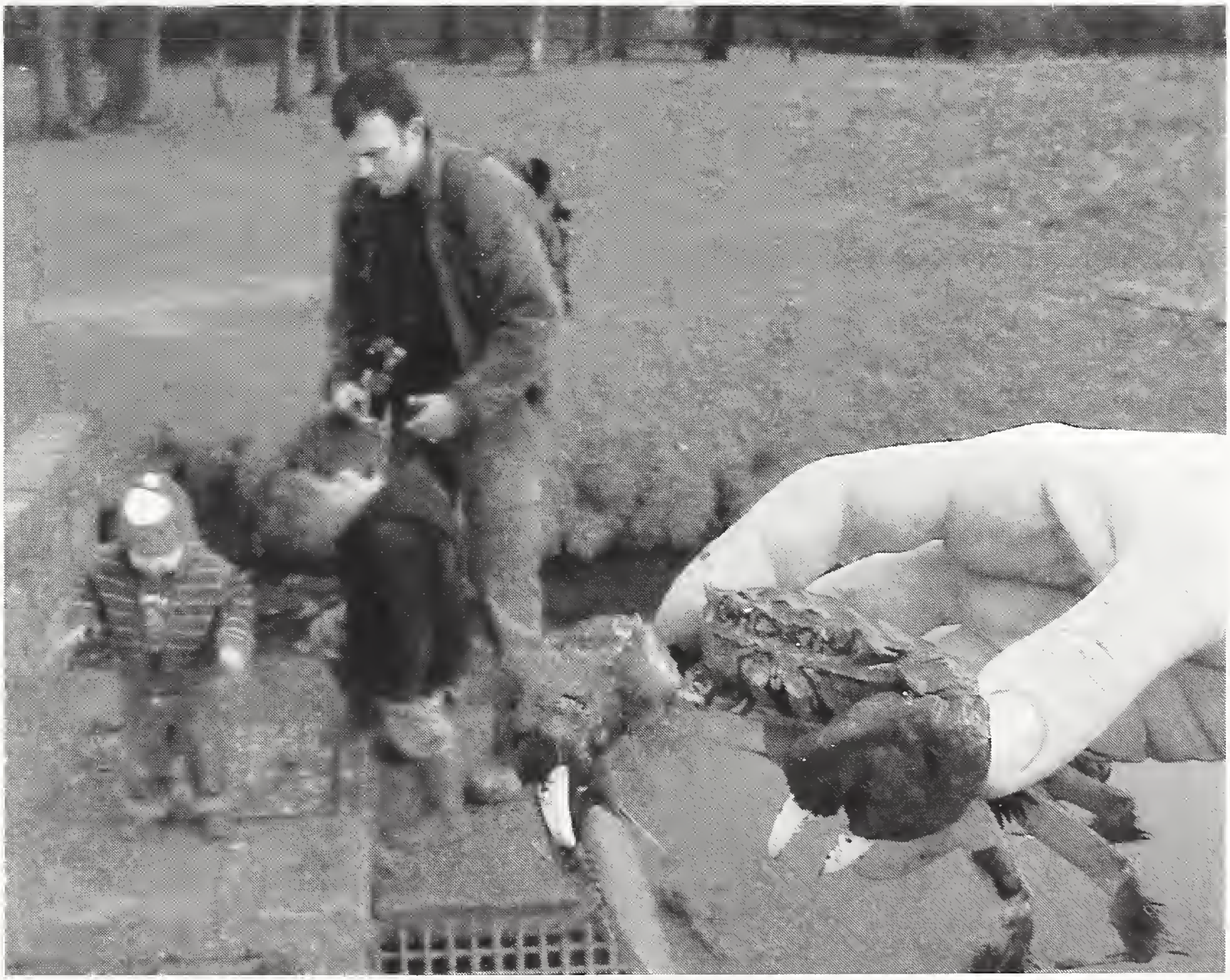

FIGURE 20. Chinese mitten crabs are abundant in the river near the Sandy Lane entrance and provide an annual feast for crows and other opportunists as they migrate to the Thames in spring.

Similarly, the American signal crayfish (Figure 21), which one magazine describes as being present in, 'the River Lea, Regent's Canal, Clissold Park and some Pret sandwiches' (*Time Out* 2007) is also abundant in the River Colne, from which the Longford River begins its journey. Like the Chinese mitten crab, its habitat altering abilities have been documented, and in addition to the statement, 'The population of crays in some Thames tributaries can beggar belief' (when seventy pounds of signal crayfish were caught in 'the last couple of hours of daylight'), the Fish and Fly website also reports that, regarding the release of sediment through burrowing activity, 'This discolouring of once-clear trout streams in the low flows of summer appears to be an increasing problem in recent years' (*Fish & Fly* 2002). It is surely only a matter of time before this highly successful invasive alien begins to pressurize the inhabitants of Bushy Park's aquatic environment in a similar manner to its Chinese counterpart.

The heron (Figure 22), which at one time was believed to have disappeared permanently as a breeding species in the London Area owing to pollution of its habitats (Fitter 1945), is a natural predator which may account for a small quota of fish and amphibians. Similarly, fish, and particularly the larval stages of amphibians, may suffer from predation by other avian predators, and whilst discussing the trials of developing amphibians, Inns (2008) describes a number of observations made by John Webley[6] that are relevant to the great crested newt population in Bushy Park:

> '. . . even the great crested newt *Triturus cristatus*, which, like the common toad, is distasteful to some species, does not escape the attention of certain bird species. His observations reveal that moorhens *Gallinula chloropus*, mallards *Anas platyrhynchos* and kingfishers *Alcedo atthis* are all predators. Moorhens, he suggests, are opportunistic feeders and take newts that surface in front of them, consuming these by pecking them into bite-sized morsels, often attracting the attentions of other moorhens in the process. Mallards appear to be somewhat more systematic and patrol the pond, waiting for surfacing newts, which they will seize and swallow whole, irrespective of the newt's size and seemingly undaunted by its distasteful skin. John has observed that the activity of kingfishers coincides with the abundance of juvenile newts between late July and early September, when the kingfishers will take young newts in vast quantities and with a high success rate. John has seen kingfishers drop more mature newts that they catch, suggesting that they may be more susceptible to the skin toxins. John also reports that the adult great crested newts in his pond are taken by grass snakes. Grass snakes seem immune to the skin toxins, and as well as having no problem in swallowing great crested newts, are one of the few animals not deterred by the significantly toxic skin of the common toad.'

All of the above predators reside in Bushy Park, and all have been recorded (including multiple sightings of grass snakes) from the site where great crested newts may be attempting to breed.

An additional threat is posed by mink *Mustela vison*. The disastrous impact of this non-native species on water voles is now well known, and it will also take fish and amphibians in its diet. This species has been described as 'thankfully scarce within the boundaries of the park, with only a single record of footprints on an artificial water vole platform' (Nigel Reeve, pers. comm. 2007), but with ample food in the aquatic habitats of Bushy Park, it is a species that has the potential to become a problem.

The lack of slow-worms and common lizards in Bushy Park may possibly be explained by loss through predation, long before the statement in *The Species Action Plan for Reptiles* (London Biodiversty Partnership 2004) became applicable:

> 'Isolated populations (of reptiles) in urban areas may be particularly vulnerable to predators such as cats and crows.'

Domestic cats, which have been described as, 'the most abundant carnivores in Great Britain' have been shown to be very effective predators of British herpetofauna (Haskins 2000, Woods et al. 2003), and may have some impact

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[6] John Webley's observations were published in the Summer 2007 *British Herpetological Bulletin* which is published by the British Herpetological Society.

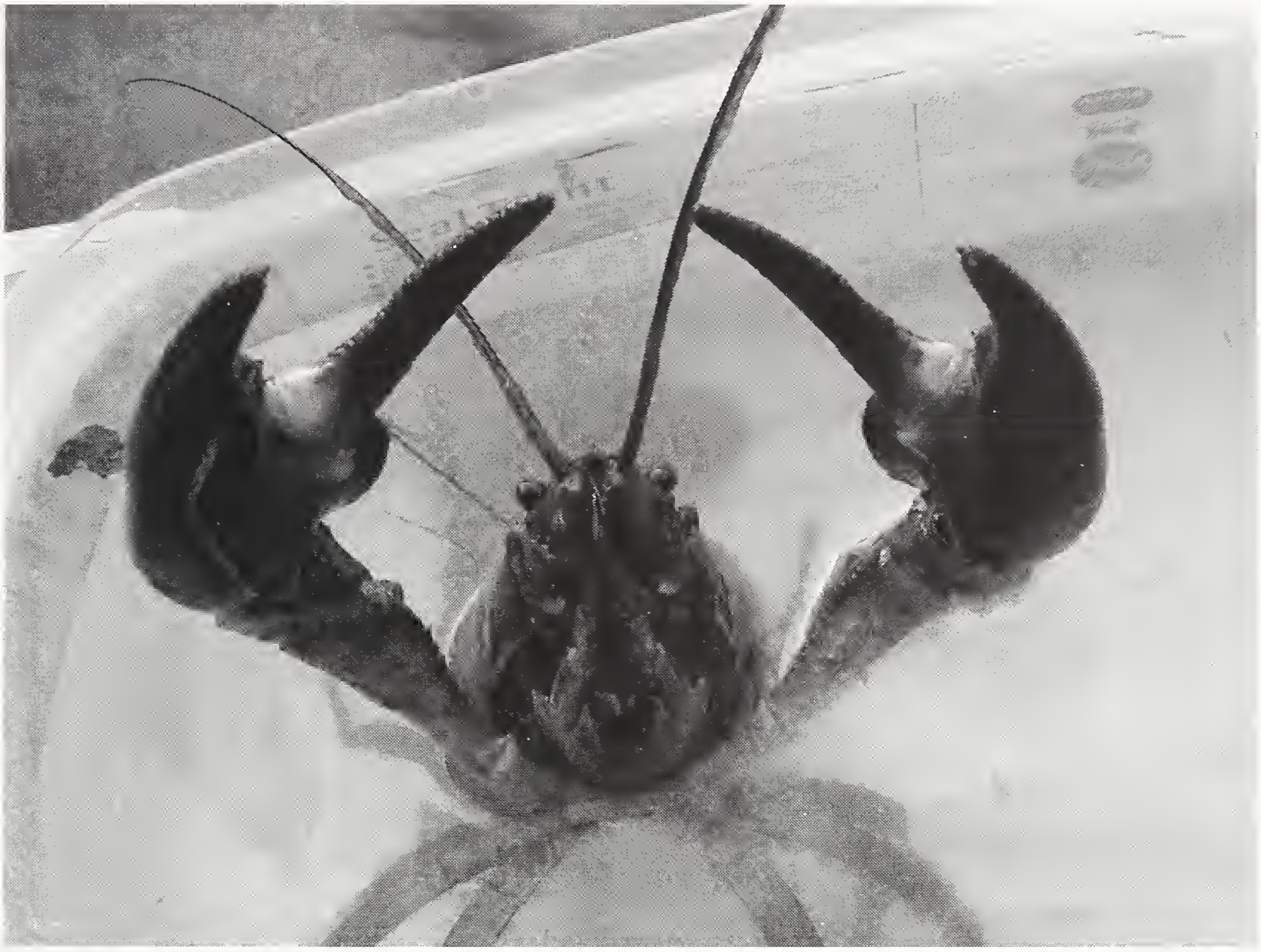

FIGURE 21. American signal crayfish: the next inevitable invader in Bushy Park?

FIGURE 22. Herons are regularly seen in Bushy Park and take their quota of fish and amphibians from its waters.

on vertebrate populations in Bushy Park, e.g. in the Brewhouse Meadow area. A more realistic explanation comes from predation by game birds. Pheasants, which were stocked by Henry VIII, have had a long-standing presence in Bushy Park (e.g. Simms 1974), and their predatory habits regarding snakes and lizards are well documented (e.g. Sheldon 2004). Isolated populations of reptiles are particularly vulnerable to extinction when their numbers are depleted through predation, and pheasants may have played a role in the disappearance of any adder, common lizard or slow-worm populations that may have once existed in the park.

## Conclusions

It is likely that owing to substantial improvements in the water quality of the Colne and Longford Rivers in recent years, the freshwater fish stocks currently found in Bushy Park are as prosperous as they have ever been. Consequently, as a result of the influence of the Longford River and its fauna on aquatic habitats in Bushy Park, it has a comparatively richer fauna than its Ham Radius neighbours, Richmond Park and Wimbledon Common.

Ironically, the recent prosperity of fish populations in Bushy Park may threaten some amphibian populations, and a lack of fish-free environments appears to pose the greatest threat to the population of great crested newts in the park. It is likely that this species would benefit from the creation of new wetland areas including appropriately vegetated temporary ponds.

The smooth newt, common frog and common toad all have healthy populations in Bushy Park. However, the fauna of Bushy Park is subject to the problem of isolation, and as such, its populations are at risk of decline through inbreeding and susceptibility to disease, predation and persecution (London Biodiversity Partnership 2004). All of the park's amphibians rely to some extent on sound woodland management which includes the retention of leaf litter and dead wood.

With a relative abundance of fish and amphibians in the park, grass snakes could do well if appropriate steps are taken to ensure the long-term protection of areas of undisturbed habitat, egg-laying and hibernation sites.

### Pave paradise, put up a parking lot . . . ?

The reptile, amphibian and fish populations of Bushy Park are facets of a larger fauna that characterizes the park and its habitats. In theory, the park should be afforded a degree of protection. It forms part of the London Mayor's Biodiversity Strategy (2002) and is under the auspices of The Royal Parks, who are aware of the importance of conserving the nationally and internationally important biodiversity of this site.

However, although the current threats to the biodiversity of Bushy Park are well recognized (e.g. Sutton and Baldock 2003), there are still examples of damaging practice in Bushy Park, which has been subject to continuing development.

Bushy Park contains regionally important (and finite) areas of lowland dry acid grassland and lowland woodland pasture/parkland, both of which are UK BAP Priority Habitats (JNCC 2001*a*). The recent development of the Broom Clumps area of Bushy Park has resulted in the incidental loss of approximately 750 square metres of acid grassland resulting from the creation of an access route, and also the loss of dead wood habitat which is part of a resource that harbours the park's internationally important complement of Europe's most threatened group of invertebrates, the saproxylic invertebrates.

The loss of fauna arising from the destruction of bare ground habitats at other sites is well documented. A relevant example is provided by Guichard and Yarrow (1948), who attributed the decline of the 'once exceptional bee and wasp fauna' of Hampstead Heath (which was virtually identical to that of

Bushy Park) to the gradual 'loss of wildness' of this site. The availability of bare ground habitats is critical to ensure the ongoing prosperity of the nationally important assemblage of aculeate Hymenoptera in Bushy Park (Sutton and Baldock 2003), and the importance of bare ground habitats for the conservation of invertebrates, including a large number of species that are scarce and threatened in Britain, is widely recognized (Key 2000, Harvey 2000, Howe 2003). In spite of this, lessons have failed to be learned regarding the 'loss of bare ground habitat through inappropriate path-building schemes' (Guichard and Yarrow 1948) in Bushy Park, regardless of how well-intentioned those schemes may be.

It should not be overlooked that the wildlife concerns of Bushy Park are being addressed, particularly in the light of recently acquired knowledge regarding the park's fauna. For example, the importance of protecting the ancient trees and decaying wood habitats of the park is now a major concern, whereas even a few years ago this resource could be seen, saproxylic fauna and all, being burnt by park workers in the Broom Clumps enclosure.

It must also be appreciated, and accepted, that The Royal Parks and its staff have the unenviable task of walking the difficult tightrope that balances public satisfaction on one hand against the long-term protection of Bushy Park's exceptional biodiversity on the other.

Nevertheless, all of the events described above have been avoidable, and it is clear that in spite of an assumed degree of protection, the flora and fauna of Bushy Park remains under threat from the ongoing piecemeal degradation of its biodiversity. Moreover, it is this consistent failure to learn lessons from the past that will ultimately lead to the park losing its 'wildness' and eventually becoming nothing more than a sanitized local amenity.

With an alternative approach, this jewel in London's crown could become a flagship of biodiversity in an urban landscape, and an example of the art of the possible.

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All photographs were taken by the author.

## References

ANGLERS' CONSERVATION ASSOCIATION. 2005. Legal update: River Colne — a gritty taste in the mouth for quarry polluter. http://charfield.net/ACA%20News%20Mar05.pdf

ASHER, J., WARREN, M., FOX, R., HARDING, P., JEFFCOATE, G. and JEFFCOATE, S. 2001. *The millennium atlas of butterflies in Britain and Ireland*. Oxford University Press, Oxford.

ATKINS, W. and HERBERT, C. 1996. Status of the crested newt *Triturus cristatus* in Greater London in 1995. *Lond. Nat.* **75**: 67–74.

ARNOLD, H. R. 1995. *Atlas of amphibians and reptiles in Britain*. 40 pp. HMSO, London.

ARNOLD, E. N. and OVENDEN, D. W. 2004. *A field guide to the reptiles and amphibians of Europe*. 288 pp. Collins, London.

BALDOCK, D., and SUTTON, P. G. 2006. Additions to the list of Aculeate Hymenoptera for Bushy Park, Middlesex. *Bull. amat. Ent. Soc.* **65** (No. 464): 29–36.

BEEBEE, T. J. C. 1977. Environmental change as a cause of natterjack toad (*Bufo calamita*) declines in Britain. *Biol. Conserv.* **11**: 87–102.

BEEBEE, T. J. C. and GRIFFITHS, R. A. 2000. *Amphibians and reptiles. A natural history of the British herpetofauna.* New Naturalist **87**, 270 pp. Collins, London.

BREDE, E. G., THORPE, R. S., ARNTZEN, J. W. and LANGTON, T. E. S. 2000. A morphometric study of a hybrid newt population (*Triturus cristatus/carnifex*): Beam Brook Nurseries, Surrey, U.K., *Biol. J. Linn. Soc.* **70**: 685–695.

BURTON, J. A. 1976. The decline of the common frog in the London Area. *Lond. Nat.* **55**: 16–18.

COLLENETTE, C. L. 1937. *A history of Richmond Park, with an account of its birds and animals.* Sidgwick and Jackson Ltd, London.

DENTON, J. 2006. The saproxylic Coleoptera of Bushy Park, Middlesex, *Bull. amat. Ent. Soc.* **65** (No. 464):18–28.

DIGIDYLAN, 2008. Photographic sequence showing a heron catching a perch at the Heron Pond in Bushy Park. http://www.digidylan.co.uk/bushypark/

DRAKEFORD, T. and SUTCLIFFE, U. (eds) 2000. *Wimbledon Common & Putney Heath. A natural history.* x + 222 pp. Wimbledon and Putney Commons Conservators, London.

ENGLISH NATURE. 1997. *London Basin Natural Area.* Report NA 66.

ENVIRONMENT AGENCY 2007. *A guide to coarse and game fisheries 2007/8 — Thames — South East.* Environment Agency, Bristol.

FEUNTEUN, E. 2007. IUCN/TRAFFIC analyses team, Cambridge, UK.

FISH & FLY. 2002. Jon Beer – 09/02 – Crayfish http://www.fishandfly.co.uk/jbedit0902.html

FITTER, R. S. R. 1945. *London's natural history,* 282 pp. Collins, London.

FITTER, R. S. R. 1949. A check-list of the mammals, reptiles and Amphibia of the London Area, 1900–1949. *Lond. Nat.* **28**: 98–115.

FITTER, R. S. R. 1960. Further records of mammals, reptiles and Amphibia in the London Area. *Lond. Nat.* **39**: 18–21.

GREEN, D. 2001. Identification: egg-laying and larval development of great crested newts. *Br. Wildlife* **12** (4): 252–255.

GUICHARD, K. M. and YARROW, I. H. H. 1948. The Hymenoptera aculeata of Hampstead Heath and the surrounding district, 1832–1947. *The Lond. Nat.* **27**: 81–111.

HARVEY, P. 2000. The East Thames Corridor: a nationally important invertebrate fauna under threat. *Br. Wildlife* **12**: 91–98.

HASKINS, L. 2000. Heathlands in an urban setting — effects of urban development on heathlands in south-east Dorset. *Br. Wildlife* **11** (4): 229–237.

HORNER, H. A. and MACGREGOR, H. C. 1985. Normal development in newts (*Triturus*) and its arrest as a consequence of an unusual chromosome situation. *J. Herpet.* **19**: 261–270.

HOWE, M. 2003. Coastal soft cliffs and their importance for invertebrates. *Br. Wildlife* **14** (5): 323–331.

ICES. 2006. *Report of the ICES/EIFAC Working Group on Eels.* International Council for the Exploration of the Sea. ICES C.M. 2006/ACFM: 16.

INNS, H. 2008. Wildlife reports: amphibians and reptiles. *Br. Wildlife* **19**(4): 277–278.

JNCC. 2001*a*. http://www.ukbap.org.uk

JNCC. 2001*b*. *Habitat Action Plan for lowland wood-pasture and parkland.* http://www.ukbap.org.uk/asp/UKPlans.asp?UKListID=5

JNCC. 2001*c*. *Habitat Action Plan for lowland dry acid grassland.* http://www.ukbap.org.uk/asp/UKPlans.asp?UKListID=14

KEY, R. 2000. Bare ground and the conservation of invertebrates. *Br. Wildlife* **12**: 183–191.

LAND USE CONSULTANTS. 2005. *Ecological Surveys of Bushy Park* (Report commissioned for The Royal Parks), pp. 1–255. LUC, London. (luc@london.landuse.co.uk)

LANGTON, T. E. S. 1991. Distribution and status of reptiles and amphibians in the London Area. *Lond. Nat.* **70**: 97–123.

LANGTON, T. E. S., LIVINGSTONE, K., CORBETT, K. F. and HERBERT, C. 2005. Conservation of the adder or northern viper *Vipera berus* in the London area. *Lond. Nat.* **84**: 79–115.

LEEMING, D. 2005. *Aquatic Invertebrates,* pp. 35–54 *In* Land Use Consultants, *Ecological Surveys of Bushy Park* (Report commissioned for The Royal Parks), pp. 1–255. LUC, London. (luc@london.landuse.co.uk)

LONDON BIODIVERSITY PARTNERSHIP. 2004. *Reptiles Species Action Plan.*

MARINE BIOLOGICAL ASSOCIATION. 2007. Marine aliens — Chinese mitten crab *Eriocheir sinensis.* http://busybee.mba.ac.uk/marine_aliens/species.asp?SpID=19

MARLBOROUGH, D. 1972. London fishes to 1971. *Lond. Nat.* **50**: 63–78.

MAYOR OF LONDON. 2002. *Connecting with London's Nature. The Mayor's Biodiversity Strategy*. Greater London Authority.

MAYOR OF LONDON. 2005. *London Wildweb: Longford River in Richmond.* http://wildweb.london.gov.uk

MINNEY, R. J. 1972. *Hampton Court.* Cassell.

MORRISON, P. 1994. *Mammals, reptiles and amphibians of Britain and Europe.* 288 pp. Macmillan, London.

MURRAY-BLIGH, J. 1997. *Procedure for collecting and analysing macroinvertebrate samples for RIVPACS application.* Biological Techniques Methods Manual BT001. Environment Agency, Bristol.

PERROW, M. and JOWITT, A. 2000. On the trail of the spined loach: developing a conservation plan for a poorly known species. *Br. Wildlife* **11** (6): 390–397.

REEVE, N. J., PALMER, I., JONES, K. E., BLANC, J. and FURE, A. 2001. Trapping surveys of small mammals on Wimbledon Common, Bushy Park and Ham Lands, south-west London. *Lond. Nat.* **80**: 109–125.

SHELDON, S. 2004. *Wyre Forest adder report 2004: review of herpetofauna behaviour correlated with weather conditions.* Unpublished report: http://wbrc.org.uk/worcRecd/Issue%2019/wyre_forest_adder_report_2004.htm

SIMMS, E. 1974. *Wildlife in the Royal Parks*, 47 pp., London: HMSO.

STILES, D. 1979. The common wall lizard *Podarcis muralis* in Middlesex. *Lond. Nat.* **58**: 25–26, pl.

SUTTON, P. G. and BALDOCK, D. 2003. The Aculeate hymenopteran fauna of Bushy Park, Middlesex. *Bull. amat. Ent. Soc.* **62** (No. 451): 216–239.

SUTTON, P. G. 2003. The British stag beetle family (Coleoptera: Lucanidae). *Bull. amat. Ent. Soc.* **62** (No. 451): 248–261.

SUTTON, P. G. 2006*a*. The history of entomological recording in Bushy Park: a personal perspective. *Bull. amat. Ent. Soc.* **65** (No. 464): 5–9.

SUTTON, P. G. 2006*b*. Diary notes: Bushy Park, Middlesex (1999–2005). *Bull. amat. Ent. Soc.* **65** (No. 464): 37–46.

SUTTON, P. G. 2007. Harlequin ladybirds in Bushy Park and other autumnal observations in 2007. *Bull. amat. Ent. Soc.* **66** (No. 475): 214–220.

T5-INFORM (BAA HEATHROW). 2004. Rivers run their new course. *T5 Inform*, Issue **7**: 1–3.

THE ROYAL PARKS (undated information leaflet). *Flora and fauna of Bushy Park.* (Regarding the presence of grass snakes and 'carp up to 35lb.')

THE ROYAL PARKS. 1993. *London's Royal Parks. Souvenir Guide.* The Royal Parks, London.

THE ROYAL PARKS. 1997. *Buildings and monuments in the Royal Parks.* The Royal Parks, London.

THE ROYAL PARKS. 2004. Press release. *Beverley Brook returns to life.* http://www.royalparks.org.uk/press/archive/press_release_2.cfm

THE ROYAL PARKS. 2007. http://www.royalparks.org.uk/parks/bushy_park/flora_fauna/fish.cfm

THORPE, R. S. 1984. Geographic variation in the western grass snake (*Natrix natrix helvetica*) in relation to hypothesized phylogeny and conventional subspecies. *J. Zool. Lond.* **203**: 345–355.

TIME OUT. 2007. *London's animal inhabitants.* http://www.timeout.com/london/aroundlondon/features/print/3161.html

TOTAL-FISHING. 2008. http://www.total-fishing.com

VARLEY, M. 1985. *Fishes* In: Fitter, R. (ed.). *The wildlife of the Thames counties*, pp. 1–214, BBONT, Oxford.

WHEELER, A. C. 1958. The fishes of the London Area. *Lond. Nat.* **37**: 80–101.

WILLIAMS, G. 1978. *The Royal Parks of London.* Constable, London.

WOODS, M., MCDONALD, R. A. and HARRIS, S. 2003. *The Mammal Society: Mammal Fact Sheets: Predation of wildlife by domestic cats in Great Britain.* http://www.abdn.ac.uk/~nhi775/cat_predation.htm

WORRALL, P. and PALMER, D. 2005. *Rivers of concrete (creating ecological value).* www.thercc.co.uk/pdfconferences/summary%20of%20papers%202005.pdf

WYCHERLEY, J. 2003. Water frogs in Britain. *Br. Wildlife* **14** (4): 260–269.

YALDEN, D. W. 1965. Distribution of reptiles and amphibians in the London Area. *Lond. Nat.* **44**: 57–69.

YALDEN, D. W. 1967. Reptiles and amphibians in the London Area 1965–1966. *Lond. Nat.* **46**: 68–75.

# Book review

***A history of ornithology.*** Peter Bircham. New Naturalist No. 104, Collins, London. 2007. 482 pp. Softback, £25, ISBN 978 0 00 719970 9; hardback, £45, ISBN 978 0 00 719969 3.

The cover of this New Naturalist states the purpose of this addition to the series is to provide a complete history of birdwatching in Britain over the last thousand years. In fact this is a review of the scientific study of birds in Britain so it is not just about birdwatching, but ornithology. This is very welcome for as Peter Bircham notes, the history of birdwatching has recently been covered by Moss, 2004 and Wallace, 2004, both of whom were favourably reviewed in *The London Naturalist* **84**: 38 (2005). In summary, this is a well-researched and clearly written book which anyone coming to the subject will find answers to most topics in ornithology. I would recommend it.

After opening chapters on the medieval bird lists and identification, the serious work begins with Francis Willughby and John Ray in the sixteenth century, with a further leap a hundred years later with Thomas Pennant and John Latham. With the eigtheeenth century there starts the separation between the systematists, identifying and cataloguing, and the field ornithologists exemplified by Gilbert White in Selborne. With the rise of field studies comes the study of individual species and the first theories of migration. I admit I had not before realized the importance of Edward Jenner, of innoculation fame, in the progress of ornithology.

The early nineteenth century is dominated by George Montagu's *Ornithological Dictionary* and the mighty histories of British birds by William MacGillivray and William Yarrell. The chaper on Alfred Newton and the founding of the British Ornithologists' Union is especially interesting both for praising Alfred Newton but for clarifying where the strains and divisions between birdwatching and scientific study begin together with the insularity of the latter. This theme is also well developed in J. Haffer's article on the origin of modern ornithology in Europe in the *Archives of Natural History* **35**, part 1 (2008).

For the twentieth century, the main early themes are the disagreements over classification, over nomenclature and the direction of the British ornithological establishment as represented by the content in the BOU journal *Ibis*.The post-war developments are as expected dominated by the famous names of Max Nicholson, Stanley Cramp, James Fisher, Peter Scott, David Lack and Bill Thorpe, and the leading players have the short biograhies needed to understand how British and worldwide ornitholgy developed. This allows also for the emergence and role of *British Birds*, RSPB, BTO and Wildfowl and Wetlands Trust to be written in context together with the rise of the conservation groups. This is supported by chapters on migration and the development of behavioural and ecolgical studies continued by a chapter on more recent research. As an aside, while the actual photographs seem random in the text I welcomed the detail on the bird artists appropriately fitted into their context rather than as one long subject chapter. This interweaving of themes is well done through the book but there does seem to have been excessive trimming on some of the topics; at this price this was a lost opportunity.

The penultimate chapter is a good restrained approach to the British Bird List and the problems of fraud, concentrating on the Hastings Rarities and, separately, the activities of Richard Meinertzhagen. I especially appreciated the summary of the Hastings records because while not convinced of their truth, too many groups of rare birds, I have declining faith in statistical arguments unless they are properly challenged. The stages in the *British Birds* review and the defence by James Harrison are clearly detailed and for once I did not feel that lingering sentiment that another examination for the defence would be interesting. The Hastings Rarities shows perhaps the gullibilty of, or rather excessive trust by, local birdwatchers, but the pages on Meinertzhagen are much darker.

In the foreword, Peter Bircham explains that as the book is intended to be historical he has not included analysis of the work of any living ornithologist although they are necessarily mentioned in the later chapters. This is sensible as this an historical review, not a guess as to the future. But it is difficult to escape the urge to wonder what will be the next stages in ornithology, what approaches will remain and which will matter most. So, I was ready for the final chapter reviewing new slants on old problems especially as this book inludes so many themes I rarely bring together but keep in separate compartments that the overall view seems feasible. The current issues of conservation, nomenclature and taxonomy, DNA fingerprinting and classification, and modern migration studies are briefly mentioned. I would have liked rather more appraisal of where British ornithogy currently is but perhaps that is another publication. This book has 482 pages of information and it is an indicator I enjoyed the book that I would have welcomed the author's views in greater depth on the current relationship between birding and ornithology together with more international comparisons to see how British ornithology has developed and what to expect for the future.

MICHAEL WILSDON

# Northern bottlenose whale *Hyperoodon ampullatus* in the River Thames: a second record for the London Area

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## Abstract

This paper summarizes the occurrence for three days in January 2006 of a juvenile female northern bottlenose whale *Hyperoodon ampullatus* in the River Thames, an event that attracted international media attention and, inevitably, a number of reporting errors. The paper also updates an earlier checklist of mammals for the London Area (Herbert 1994).

## Introduction

When news of the presence of the whale broke in the media, one well-respected national broadsheet newspaper described the animal as the first northern bottlenose whale in the Thames since a 40-foot (12.2 metre) specimen was stranded near Barking on 27 November 1899. That individual actually measured 20.3 metres (Dobson 1999) but in any case either length is far too great for the northern bottlenose whale, a sexually dimorphic species that reaches a maximum length in males of 9.5 metres and females of 8.5 metres (Reid et al. 2003). The 1899 stranded individual was in fact a fin whale *Balaenoptera physalus* and this individual has already been well documented elsewhere (Fitter 1949).

The only previous record of a northern bottlenose whale in the London Area was a male seen at the entrance to Barking Creek (TQ4581) in July 1891 (Laver 1898). Three earlier sightings of the species in the 'River Thames' (1789), 'near London' (1804) and 'Essex' (1828) cannot be accurately allocated to our recording area and may refer to individuals present in the wider estuary.

## The 2006 individual

There was some initial confusion in the media regarding the sighting with at least one early report referring to the presence of a (long-finned) pilot whale *Globicephala melas*. Some later also articles went on to refer to the individual as Pete, Wally or Willy but interestingly, given its gender, none of the names used appeared to be female!

Thousands of people lined the riverbanks and bridges causing at least one bridge to be temporarily closed to all vehicles, apart from buses and taxis, on public safety grounds. Its time spent in the London Area can be summarized for the record by the following information and approximate timings:

**19 January.** The first reported sighting was of two whales seen off Southend-on-Sea, Essex. By 09.30 hours, a sighting was made from the Queen Elizabeth Bridge near Dartford and they were clearly heading further into the estuary. At 11.00 hours, they were reported near Dagenham and by 15.00 hours one was seen near the Thames Barrier at Greenwich. One individual was later observed heading back towards the sea — a lucky occurrence given the known behaviour of this species to exhibit caring actions, including remaining beside others in distress.

**20 January.** At 08.30 hours the whale was seen near Jubilee Bridge, Waterloo, followed by observations at 09.45 hours at Westminster Bridge, 11.00 hours at Lambeth Bridge, 12.30 hours at Millbank Tower, 12.50 hours at Vauxhall

Bridge and 13.30 hours near Battersea Power Station, where it almost beached but was successfully returned to the river with assistance from volunteers. At 14.00 hours, boats led by the British Divers Marine Life Rescue successfully turned the animal around just before Albert Bridge and it started to head downstream being seen near Battersea Park at dusk.

**21 January.** At 08.10 hours, it was seen near Albert Bridge and at 11.45 hours it again entered shallow water near Battersea Bridge. By 12.45 hours, a pontoon was secured around the whale and at 14.45 hours it was lifted in a sling by crane onto a barge for transportation. It subsequently suffered convulsions, with an increased respiration rate, and died at approximately 19.00 hours on the barge whilst being ferried downstream to a planned release site near Margate, Kent, although by that time a decision had already been taken to euthanize the animal by lethal injection.

An initial post mortem was undertaken at Gravesend, Kent, that determined severe dehydration, cardiovascular failure, muscle damage and a reduction in kidney function (whales obtain water from their food). It was, however, found to be remarkably free of parasites and was probably healthy before it entered the North Sea (Paul Jepson pers. comm.).

It can be speculated that the animal most probably took a wrong turn into the North Sea in Scotland. This species, the largest of the British beaked whales, is primarily found in water >500 metres in depth and occurs principally off the northern coast of Scotland and the west coast of Ireland. Although squid beaks were found in its stomach during the post-mortem, the animal would certainly not have been able to feed for its three days whilst in the River Thames and most probably for the whole of the time it was in the North Sea.

The whale was a juvenile female and was probably less than 11 years old and sexually immature, although it was too old to be dependant on its mother — presumed to be the individual it was seen with off Southend-on-Sea when first reported. It measured 5.85 metres (19 feet) in length and weighed several tonnes. The stranding in midwinter does not, however, fit in with the expected increased stranding frequency in late summer and autumn in British waters (e.g. two individuals of the same species that subsequently stranded at Skegness, Lincolnshire on 31 August 2006).

After examination by the Zoological Society of London, the skeleton was transferred to the Natural History Museum for further study and added to its collection in September 2006. During that further examination, unusual pitting of one vertebra in the thoracic region and the atlas vertebra was noted, although the significance of this find is not clear (www.nhm.ac.uk/about-us/news/2006/september/news_8212.html).

## References

DOBSON, J. 1999. *The mammals of Essex.* Lopinga Books, Wimbish.

FITTER, R. S. R. 1949. A check-list of the mammals, reptiles and Amphibia of the London Area, 1900–1949. *Lond. Nat.* **28**: 98–115.

HERBERT, C. 1994. A check-list of the mammals of the London Area, 1900–1994. *Lond. Nat.* 75: 91–94.

LAVER, H. 1898. The mammals, fishes and reptiles of Essex. *Essex Field Club Special Memoirs* **3**.

REID, J. B., EVANS, P. G. H. and NORTHRIDGE, S. P. 2003. *Atlas of cetacean distribution in north-west European waters.* Joint Nature Conservation Committee, Peterborough.

# Diel densities of young-of-the-year fishes in the River Lee (Hertfordshire) over a 24-hour period in late summer

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KEY WORDS: dispersion, point abundance sampling, diel, nocturnal.

## Summary

Data on the diel density and dispersal of young-of-the-year (0+) fishes in the River Lee (Hertfordshire) at Holwell Bridge were examined in August 1998 to determine whether patterns in this stretch with no fencing along the banks were similar to those observed in August 1996 in a nearby, downstream stretch (Woolmer's Park), where the river is fenced off. Although the numbers of 0+ fish captured (both overall and for most fish species) was higher at night or dawn, similar to Woolmer's Park, the differences were not statistically significant, probably due to low sample number.

## Introduction

The upper River Lee between Welwyn Garden City and Hertford has been the subject of numerous studies, which have examined the microhabitat (Watkins et al. 1997), movements (Vilizzi et al. 2006), responses to riparian management (Copp and Bennetts 1996), as well as diel patterns of fish and invertebrate drift (Faulkner and Copp 2001, Copp et al. 2002, Edmonds-Brown et al. 2004) and diel resource use in fish (Copp et al. 2005*a*, 2005*b*, Copp 2008). In the preliminary studies of diel behaviour in young and small fishes during summer (Copp 2004), contagion was observed to decrease in most species at night, but minnow *Phoxinus phoxinus*, stone loach *Barbatula barbatula* and bullhead *Cottus gobio* were the only species to demonstrate clear diel patterns, increasing in density at night, especially along the banks. In a subsequent study (Copp et al. 2005*a*), consistent diel patterns were observed in young and small fishes with regard to fish shoaling behaviour, habitat use, and in the size and composition of prey taken. The relatively consistent diel patterns observed suggest that data from single 24-hour cycles in late summer can be representative of daily patterns. These studies were both undertaken in the same stretch within the Woolmer's Park estate (National Grid Reference: TL 288 100), which is characterized by woody riparian vegetation and extensive beds of marginal bank vegetation (see Vilizzi et al. 2006). The aim of the present study was to determine whether similar diel patterns can be observed in an upstream stretch characterized by virtually no woody riparian vegetation and limited margin bank vegetation.

## Study area, material and methods

The study site was located about 300 metres downstream of Holwell Bridge, which lies within the Cecil Gascogne Estates, Hertfordshire (see Vilizzi et al. 2006). Along this stretch, riparian vegetation (trees, bushes) was very sparse, with only one tree overhanging one bend of the river. The study stretch consisted of a riffle/pool/run sequence, and channel shape was generally natural, but the banks were trampled down in some locations due to an absence of fencing and the presence of grazing sheep. Discharge varies from 0.5 to 5 $m^3 s^{-1}$, with peaks usually in winter and daily discharge patterns strongly influenced by releases of treated domestic effluent (Faulkner and Copp 2001).

Sampling was undertaken on 26–27 August 1998 using point abundance sampling by electrofishing, with a portable DEKA unit modified for small fishes (anode of 10 cm diameter; see Copp and Garner 1995). Using the same methods as described in Copp 2004), 160 point samples were collected at midday (12:00–13:00), dusk (18:00–19:00), midnight (00:00–01:00) and dawn (05:00–06:00). The sampling points were selected haphazardly (point of the finger, arm outstretched, with eyes closed), in an upstream direction, during each of four sampling excursions. Fish relative density was calculated as the number of specimens captured per total surface area sampled for each sampling excursion (Copp 1989, Copp and Garner 1995). All times of day are given in local time. River discharge during August varies diurnally, ranging from 55 to 65 $m^3 s^{-1}$ (Faulkner and Copp 2001).

Diel patterns in 0+ fish assemblage composition and occurrence were investigated by combining a robust unconstrained ordination with a rigorous statistical test of the hypotheses, which were applied to the 160 × 8 (samples × species) matrix of fish counts following transformation into presence/absence. Accordingly, non-metric multidimensional scaling (MDS) was used to display patterns in fish occurrence over the four sampling periods, using a zero-adjusted Bray-Curtis dissimilarity measure due to the presence of blank samples (PRIMER v6: Clarke and Gorley 2006). Permutational multivariate analysis of variance (PERMANOVA: Anderson 2005) was then carried out to test the null hypothesis ($\alpha$ = 0.05) of no difference between periods. (Notably, permutational $F^{\#}$, $P^{\#}$ and $P^{MC}$ values replace conventional fully-parametric ones, with MC = Monte Carlo more suitable for small sample sizes.) Multivariate variability within each period was assessed by a test of multivariate dispersion, followed by pair-wise comparisons between periods (routine MVDISP of PRIMER v6). Finally, between-period comparisons of overall fish density (i.e. with species counts summed over ten successive samples) also were made by PERMANOVA, and species-specific (hence, univariate) comparisons by PERANOVA, using the Euclidean distance measure. Importantly, the permutational approach to the analysis of samples not meeting the requirements of fully parametric (M)ANOVA has been shown to be more powerful than non-parametric techniques (e.g. Manly 1997).

## Results

Species of 0+ fish encountered in the River Lee at Holwell Bridge of the 24-hour period were: chub *Leuciscus cephalus* (37 specimens), threespine stickleback *Gasterosteus aculeatus* (35), minnow *Phoxinus phoxinus* (15), stone loach *Barbatula barbatula* (10), barbel *Barbus barbus* (10), bullhead *Cottus gobio* (6), gudgeon *Gobio gobio* (2), and Eurasian perch *Perca fluviatilis* (1).

Overall fish density (mean number of fish $m^{-2}$ ± SE) was highest at midnight (29.9±7.0), followed by dusk (13.4±4.7), dawn (12.7±3.9) and midday

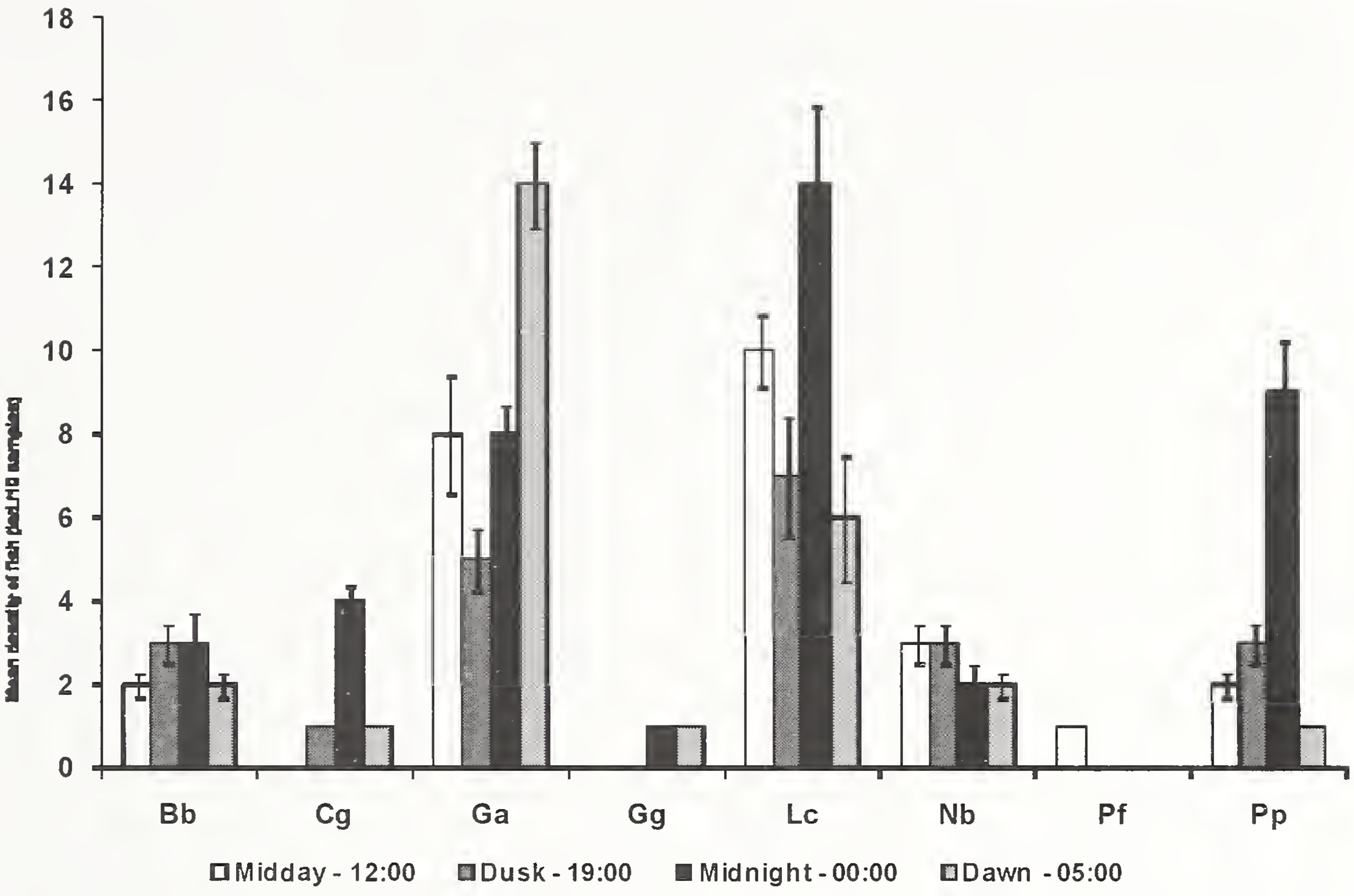

FIGURE 1. Relative density (±SE) of 0+ fishes in the River Lee at Holwell Bridge (Hertfordshire) over a 24-hour period (26–27 August 1998).

(9.9±3.0), but these differences were not significant ($F^{\#}_{3,12}$ = 0.862, $P^{MC}$ = 0.605). And despite visual differences between periods for threespine stickleback, chub and minnow, the same was also true for species-specific comparisons (Figure 1). Indeed, there were no appreciable differences in fish assemblage composition and occurrence (Figure 2) between periods of the diel cycle, with most samples overlapping one another, both within and between periods. This was confirmed statistically by PERMANOVA, with no significant differences found between periods of day ($F^{\#}_{3,156}$ = 1.168, $P^{\#}$ = 0.287). On the other hand, although multivariate dispersions were overall comparable between midday, dusk and dawn (0.846, 0.976 and 0.980, respectively), dispersion at midnight was slightly higher (1.198), and this was supported by the largest dissimilarities between dusk vs. midnight (– 0.338) and midday vs. midnight (– 0.225).

## Discussion

Diel patterns in fish abundance are a common feature in both small and large water courses (e.g. Copp and Jurajda 1993, 1999, Garner 1995, Copp et al. 2005*b*, Mastrorillo and Copp 2005), including the downstream stretch of the River Lee at Woolmer's Park (e.g. Copp 2004, Copp et al. 2005*a*), which is contiguous to the Holwell Bridge study site. However, unlike these previous studies, the differences in fish density between the four intervals of the diel cycle at Holwell Bridge were not statistically significant, and this is likely to be a consequence of the relatively low number of samples taken. When the 0+ barbel densities from the present study were combined with 0+ barbel density data from previous studies. Vilizzi et al. (2006) also found the densities to be consistently higher at night over diel cycles in August, but the differences with other times of day were not significant in any of the three sampling years (1996, 1997, 1998). In examining the potential influence of fencing, Vilizzi et al. (2006) were not able to make direct comparisons between the unfenced and fenced stretches, because sampling was in different years, but night-time

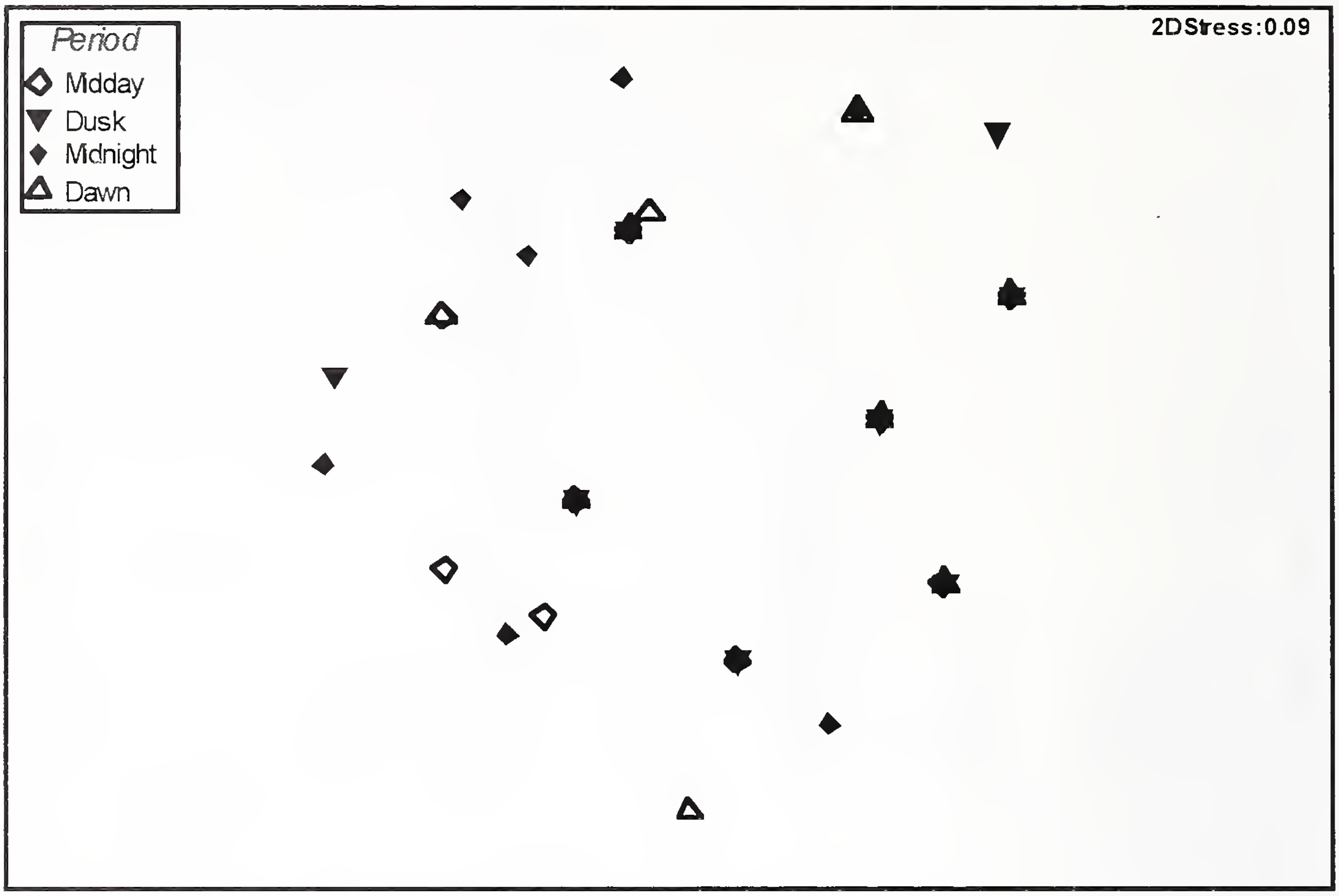

FIGURE 2. MDS plot of the composition and occurrence of 0+ fishes in the River Lee at Holwell Bridge (Hertfordshire) over a 24-hour period (26–27 August 1998).

densities of 0+ barbel in the unfenced stretch at Holwell Bridge in 1998 were lower than those values for the fenced-off stretch at Woolmer's Park. These densities of 0+ barbel are low relative to other, similar European rivers (e.g. Bischoff and Scholten 1996, Baras and Nindaba 2000), and this may be due to a shortage of suitable habitat (Vilizzi et al. 2006). The overall densities of fish at Holwell were similar to those reported for Woolmer's Park (Copp et al. 2005*a*), and despite a lack of statistical significance, there appears to be a diel pattern in the data.

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## References

ANDERSON, M. J. 2005. *PERMANOVA: a FORTRAN computer program for permutational multivariate analysis of variance.* Department of Statistics, University of Auckland, New Zealand.

BARAS, E. and NINDABA, J. 2000. Diel dynamics of habitat use by riverine young-of-the-year *Barbus barbus* and *Chondrostoma nasus* (Cyprinidae). *Arch. Hydrobiol.* **146**: 431–448.

BISCHOFF, A. B. and SCHOLTEN, M. 1996. Diurnal distribution patterns of 0+ barbel *Barbus barbus* (L.) in two different types of habitats in the River Sieg, Germany. *Folia Zool.* **45** (Suppl. 1): 13–20.

CLARKE, K. R. and GORLEY, R. N. 2006. PRIMER v6: *User Manual/Tutorial.* PRIMER-E, Plymouth UK, 192 pp.

COPP, G. H. 1989. Electrofishing for fish larvae and 0+ juveniles: equipment modifications for increased efficiency with short fishes. *Aquaculture and Fisheries Management* **20**: 177–186.

COPP, G. H. 2004. Behaviour of young and small fishes in the River Lee (Hertfordshire) over a twenty-four hour cycle in mid summer. *Lond. Nat.* **83**: 87–95.

COPP, G. H. 2008. Putting multi-dimensionality back into niche breadth: diel vs. day-only niche separation in stream fishes. *Fund. Appl. Limnol.* **170**: 273–280.

COPP, G. H. and BENNETTS, T. A. 1996. Short-term effects of removing riparian and instream cover on barbel (*Barbus barbus*) and other fish populations in a stretch of English chalk stream. *Folia Zool.* **45**: 283–288.

COPP, G. H. and GARNER, P. 1995. Evaluating microhabitat use of fish larvae and juveniles with Point Abundance Sampling. *Folia Zool.* **44**: 145–158.

COPP, G. H., DOHERTY, S., FAULKNER, H., WATKINS, M. S. and MAJECKI, J. 2002. Diel drift behaviour of fish eggs and larvae, in particular barbel, *Barbus barbus* (L.), in an English chalk stream. *Fish. Manag. Ecol.* **9**: 95–104.

COPP, G. H. and JURAJDA, P. 1993: Do small fish move inshore at night? *J. Fish Biol.* **43** (Suppl. A): 229–241.

COPP, G. H. and JURAJDA, P. 1999. Size-structured diel use of banks by riverine fishes. *Aquat. Sci.* **61**: 75–91.

COPP, G. H., SPATHARI, S. and TURMEL, M. 2005*a*. Consistency of diel behaviour and interactions of stream fishes and invertebrates during summer. *River Res. Appl.* **21**: 75–90.

COPP, G. H., VRANOVSKÝ, M., ČERNÝ, J. and KOVÁČ, V. 2005*b*. Diel dynamics of young fishes and zooplankton in a lentic side-channel of the River Danube. *Biologia* (Bratislava) **60**: 179–188.

EDMONDS-BROWN, V., COPP, G. H. and MAJECKI, J. 2004. Diel patterns of drift by macroinvertebrates in the River Lee (Hertfordshire) during low discharge. *Lond. Nat.* **83**: 145–157.

FAULKNER, H. and COPP, G. H. 2001. A model for accurate drift estimation in streams. *Freshwat. Biol.* **46**: 723–733.

GARNER, P. 1996. Diel pattern in the feeding and habitat use of 0-group fishes in a regulated river: the River Great Ouse, England. *Ecol. Freshwat. Fish.* **5**: 175–182.

MANLY, B. F. 1997. *Randomization, Bootstrap, and Monte Carlo Methods in Biology*. Ed. 2. Chapman & Hall, London.

MASTRORILLO, S. and COPP, G. H. 2005. Diel dynamics of young and small fishes in a side-channel of the River Garonne, France, before and after a late-summer spate. *Annls Limnol.* **41**: 15–25.

VILIZZI, L., COPP, G. H., PEŇÁZ, M. and CARTER, M. G. 2006. Movement and abundance of barbel *Barbus barbus* in a mesotrophic chalk stream: the River Lee, England. *Folia Zool.* **55**: 183–197.

WATKINS, M. S., DOHERTY, S. and COPP, G. H. 1997. Microhabitat use by 0+ and older fishes in a small English chalk stream. *J. Fish Biol.* **50**: 1010–1024.

# Book review

***Spiders — The ultimate predators.*** Stephen Dalton. A & C Black. 2008. 208 pp., 280 × 216 mm. Hardback, £19.99. Colour photographs throughout. ISBN 978 1 40810 697 6.

Stephen Dalton is an award-winning pioneer of high-speed and macro wildlife photography, with a big following among naturalists and photographers. He is the author of fifteen books since his first, *Borne on the Wind,* published in 1975, showed stunning wildlife better than can be seen with the naked eye. His latest book follows this tradition.

One of the advantages of studying spiders is that there is an excellent, in-print, field guide *Spiders of Britain and Northern Europe* by Michael Roberts. The illustrations in Roberts' field guide are mainly of subjects as they appear under the microscope, and so much of their vibrancy and personality is lost. We have to go back to the classic 1958 New Naturalist, Bristowe's *The World of Spiders* to get the brilliant drawings of Arthur Smith and the illuminating observations of Bristowe. It was Smith's illustrations that I thought of when I first looked at Stephen Dalton's latest large-scale, glossy book. The flair and spirit of Smith's drawings is reproduced here with page after page of dramatic, faultless and exquisite photographs, accompanied with descriptions in Dalton's own highly personal style. This high-quality book is primarily intended as an introduction and an entertainment rather than a piece of scientific natural history, as I think the subtitle *The ultimate predators* gives away. Although spiders are all predators and have evolved to occupy many niches, they are no more 'ultimate' in an evolutionary sense than any other group. The most comprehensive photographic field guide continues to be the 1983 *Country Life Guide to Spiders* by Dick Jones, no longer in print.

A fair selection of spiders from Britain and North America are featured, sequenced by the way they catch their prey rather than by their taxonomy or evolution. This is fine for an introduction, but gives little sense of how styles of web-spinning and other characters and behaviours may have evolved. Common names are given for each species, with British and American versions providing some overlap, so that hammock, dwarf and money spiders all refer to the same family. I'm not sure what American readers will make of the 'cricket-bat' orb weaver, *Mangora acalypha*. Helpfully, scientific names are also given for each species, and, in a useful feature, the etymology of the scientific names is given to help make them a little more approachable. It was pointed out to me that there are some errors here as *Latrodectus* is transcribed as *Lactrodectus* and that *Agalenatea redii* is believed to gain its specific name from Francesco Redi, the 17th century Italian scientist whose work disproved the idea of spontaneous generation. The text may be a little brief in places, but it is well-informed for a self-proclaimed novice. The introductory chapters are well written and illustrated, and give a very good start to learning about spiders.

Spiders are never easy to photograph. Dalton spent two years producing this book, relating that he benefited from a Field Studies Council introductory course plus heavy reliance on the field expertise of Evan Jones, an arachnologist neighbour. The photographs all provide a lifestyle example, in many cases better than can be obtained by general field observation and, although it does not show, half were taken in a 'studio' setup. His chapter on 'Photographing Spiders' is no more than a basic introduction as this is not intended as a 'how to' manual, but makes interesting reading nevertheless. He has not used film since 2002, and recommends a DSLR, macro lens and flash as the foundation of success. He does not, however, explain how to manipulate a camera and tripod, main light, fill light and reflector in windy and wet habitats while trying to coax a secretive and highly sensitive furry black spider into displaying an active pose — this is the field craft of a master craftsmen. This book would make an excellent buy for any naturalist, perhaps to help encourage a novice's interest and respect for spiders, and I am sure that even the expert arachnologist will find the images to be informative and entertaining.

Mick Massie

# Distribution of the hazel dormouse *Muscardinus avellanarius* in Greater London

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## Abstract

This paper summarizes the past and present distribution of the hazel dormouse *Muscardinus avellanarius* within the modern boundary of Greater London and details the results of the first targeted survey to identify its distribution throughout the capital.

## Introduction

The hazel dormouse is a nationally scarce species that is protected under both UK and European legislation. It has been the subject of intensive research and practical conservation initiatives during the past two decades in order to arrest its long-term decline and secure its future status. The species occurs primarily in deciduous woodland with a well-developed under-storey, overgrown hedgerows, scrub and plantations with an appropriately dense shrub layer.

The size of the woodland has been found to be important for dormice and they are more frequently present in woodlands >20 hectares and where there is good connectivity to other woods as they are poor colonizers. Habitat fragmentation is known to have a major impact on populations and in areas of high fragmentation they may only be found in the larger woodland blocks >50 hectares. This is likely to have a significant impact on their distribution in Greater London where past development and wide road corridors are at their highest density.

The potential for hazel dormice in Greater London is therefore now effectively limited to those rural areas that adjoin the surrounding counties, have a high woodland cover and have retained an extensive network of hedgerows to facilitate movement and dispersal throughout the landscape.

## Historical records

There are relatively few records of hazel dormice in the literature from the area now covered by the modern-day Greater London boundary. The species was, however, described as 'common' in the Blackheath area in the mid nineteenth century (Greenwich Natural History Club 1859: 15) and was also known in Victorian times from sites in the present London Borough of Bromley area near to the Keston/Farnborough and Cudham areas.

Fitter (1949: 105) also noted that the species 'had perhaps the oddest distribution of all mammals to-day in the London Area' and he described it as 'locally distributed over the rural parts of the Area' before 1914, although he was not of course referring solely to the future Greater London area that is the subject of this paper. He also noted its presence before 1914 at unspecified sites in Harrow, Ruislip, 'a wood within a few miles of the Crystal Palace' and at Perivale Wood.

From 1920, however, he described reported occurrences as being almost exclusively confined to a small area of eastern Surrey and all presumably outside of the present Greater London boundary. The only record away from this Surrey area was by K. E. Hoy in April 1943 from Knighton Wood, Epping Forest (TQ 40 93) on the very edge of the Greater London boundary.

An undated but more recently published tetrad record (TQ 57 85) from Cranham Wood Nature Reserve in the London Borough of Havering (Dobson 1999) is considered by the present author to be erroneous as it lacks any traceable supporting data and is also from atypical habitat.

## Recent records

Due to the decline of the species at a national level, the hazel dormouse was added to English Nature's (now Natural England) Species Recovery Programme in 1992 and a mass public participation campaign entitled the 'Great Nut Hunt' was launched in 1993. Both of these developments, immediately preceding the author's appointment as mammal recorder for London, resulted in very few direct new records from Greater London, although they provided the impetus for new survey work to be undertaken at the historical sites and in other areas of suitable habitat in the outer boroughs.

The majority of this new survey work was undertaken by the London Mammal Group in 2001 and 2002 and was concentrated in the southern boroughs of Kingston-upon-Thames, Croydon, Bromley and Bexley where the majority of optimal woodland and hedgerow habitat remained. The primary survey methodology was an autumn search for hazelnuts bearing the distinctive oblique tooth marks showing that only hazel dormice had opened the nuts (Hurrell and McIntosh 1984). A few sites, especially hedgerows, that lacked sufficient hazel were also surveyed using standard nest tubes under a licence from English Nature issued to Andy Swan of the specialist protected species consultancy Amphibian, Reptile and Mammal Conservation Limited. The survey was organized on a tetrad basis with the best habitat compartments being sampled in each tetrad.

The results of this survey are shown in Figure 1 and clearly illustrate the distinctive distribution of the species in Greater London. The core area of their distribution has been shown to be located in the London Borough of Bromley and broadly lies between the A21 and the Greater London boundary with Kent. A secondary area of distribution is centred in the southernmost part of the London Borough of Croydon to the south of Coulsdon and Kenley.

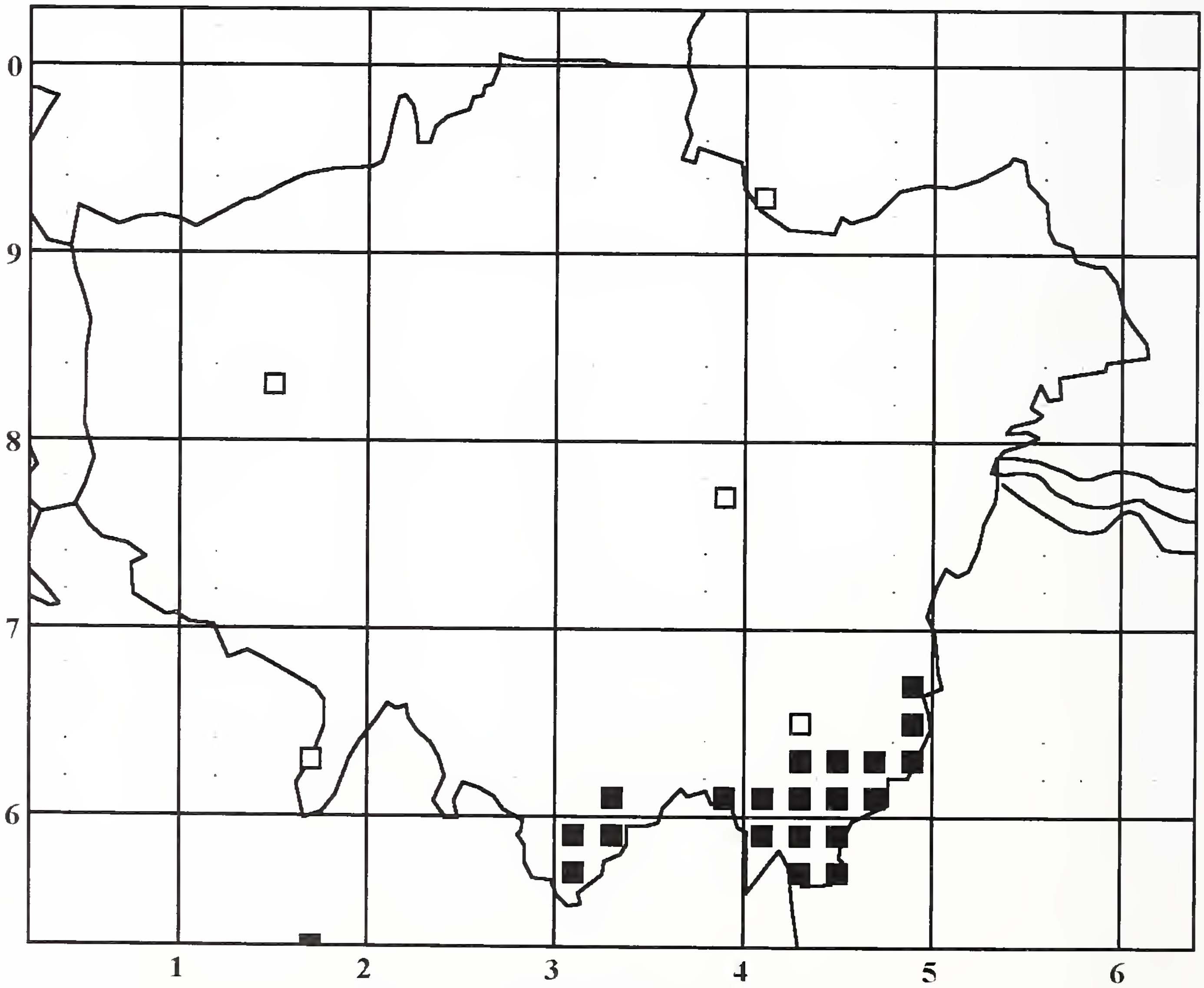

FIGURE 1. Distribution of the hazel dormouse in Greater London. Black squares denote recent records 1994–2003, open squares denote historical records 1800–1993.

No evidence of the species could be found at any of the historical sites or in the Royal Borough of Kingston-upon-Thames, although access difficulties to the best habitat may have affected the final results in the latter borough. Although a few additional tetrads may be discovered in the future, it is now considered that the distribution of the species in Greater London has been accurately documented.

In addition to the new tetrad-based distribution survey to identify the occurrence of the species in the capital, two permanent nest box schemes have also been set up, both in the London Borough of Bromley, to monitor populations as part of the National Dormouse Monitoring Programme. One is operated under the auspices of the Bromley Ranger Service and the other is organized by the London Mammal Group.

## Acknowledgements

The author wishes to thank all landowners for their support and access to various woodlands, Andy Swan for undertaking the bulk of the fieldwork for the tetrad survey, and Hazel Ryan, formerly of the Bromley Ranger Service, for information about their nest box scheme and other invaluable assistance in the borough.

## References

DOBSON, J. 1999. *The mammals of Essex.* Lopinga Books, Wimbish.

FITTER, R. S. R. 1949. A check-list of the mammals, reptiles and Amphibia of the London Area, 1900–1949. *Lond. Nat.* **28**: 98–115.

GREENWICH NATURAL HISTORY CLUB. 1859. The fauna of Blackheath and its vicinity. *Rep. Greenwich nat. Hist. Club* **1**: 1–46.

HURRELL, E. and McINTOSH, G. 1984. Mammal Society Dormouse Survey, January 1975 – April 1979. *Mammal Rev.* **14**: 1–18.

# Book reviews

***The historical ecology of the River Arun and its beaches at Littlehampton, West Sussex: 1,000 years of change.*** Brian Morton. The Ray Society, London. 2007. 198 pp. £35, hardback. ISBN 9 903874 40 7.

I suspect some justification is needed to review a book on the beaches of Littlehampton in *The London Naturalist* as the links may not seem too obvious. While the aim of this book is to provide an unabashedly local explanation how Littlehampton's river and seafront has developed and then been changed through human intervention, there is also the desire to raise the profile of historical ecology.

The first section of the book is a review of the geological and historical past which I found extremely lucid and also provides the historical relationship when the river was navigable as far as Arundel and the later development of the port of Littlehampton. The next section details the development of the south coast shoreline and the various species to be found in the local shoreline.

This is extended to describing the River Arun flood plain as far back as Arundel and especially the marshland remnants. The final section concentrates on the lessons from the past and how the remnants can best be preserved, enhanced, and educational facilities provided. Apart from the usual points on the limited or perverse effect of beach retention plans, the author's main concern is the casual environmental destruction and especially the failure to recognize the need to protect remnant marsh.

As I have frequently considered that a bypass around Arundel might be rather useful I found the environmental points rather salutary. But with rising sea-levels the impact on the Arun valley would certainly be interesting if the same approach as allowing managed retreat in the Cuckmere in East Sussex was followed. A slight idea how the Arun flood plain might have looked like can best be viewed is from the train looking north to Arundel from the Ford triangle.

Apart from some puzzlement on the format of the book, which is landscape rather than portrait and has a certain coffee-table look, I welcome the aim to provide a good ecological history as a base-line and also to encourage sufficient local awareness to ensure informed decision-making. I doubt if anywhere would suffer if that approach was taken, but not everywhere will necessarily find a just-retired marine ecologist professor with the skill and keenness to take on the task and deliver such a useful and clear guide.

Michael Wilsdon

***The larger water beetles of the British Isles.*** Peter Sutton. Amateur Entomologists' Society. 2008. 84 pp. including 4-page colour section (plus colour inside covers) and distribution maps. £11.90 inc. p. & p. (AES/RES Members' price £8.90). ISBN 0 900054 74 3. (All AES publications can now be purchased online at www.amentsoc.org)

For those who admire the spectacular larger water beetles of the British Isles, this recently published softback book with colour illustrations of our aquatic coleopteran megafauna provides up-to-date distribution maps and fascinating details of their life-histories. It covers eleven species including the six native 'Great Diving Beetles' and the 'Silver Water Beetles'. It is also copiously illustrated with text figures and has much additional information including details of observed climate-induced range changes and the conservation measures required to ensure their continued survival.

K. H. Hyatt, Editor, *Lond. Nat.*

# Lepidopterists through the lens: portraits from the first fifty years of the LNHS

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## Abstract

An album in the archives of the London Natural History Society contains photographs of fifty Victorian entomologists, most of whom were members of the Society's predecessors, the Haggerstone and City of London Societies. They have been identified, and their character and achievements reconstructed, by reference to the Society minute books and to contemporary entomological literature. This article traces the Society's development from a collectors' club to an association of scientifically minded naturalists, through pen-portraits of some of these members. They include Thomas Eedle, personally responsible for much of Lord Walsingham's collection of microlepidoptera (now in the Natural History Museum); Walsingham himself, patron of the Society; the early Australian lepidopterist Ernest Anderson; the renowned entomologist T. A. Chapman; and J. W. Tutt who first recognized industrial melanism as an example of Darwinian adaptive evolution in action.

## Introduction

In June 1858, five men collecting butterflies at Wickham, Kent, decided to form a society. Thus began the Haggerstone Entomological Society, later the City of London Entomological and Natural History Society, which in 1914 merged with the North London Natural History Society to form the London Natural History Society. In the archives of the LNHS is a photograph album, acquired in 1891, containing portraits of fifty Victorian entomologists: thirty-three were members of the Haggerstone Society, ten joined the City of London (three as honorary members) while the other seven, though not members, were entomologists who had helped the Society or were held in high regard. Some of these men (they are all men — not until 1910 was a woman, Mrs Hemmings, admitted, and then only because her husband joined too) achieved fame but most are forgotten. The Appendix lists their names and brief details. The stories of a few of them, reconstructed here from the Society's minute books and the entomological literature of the time, reveal a world in which a common love of natural history struggled, sometimes successfully, to bridge the social gap between rich and poor, lord and commoner, amateur and professional.

## In the beginning

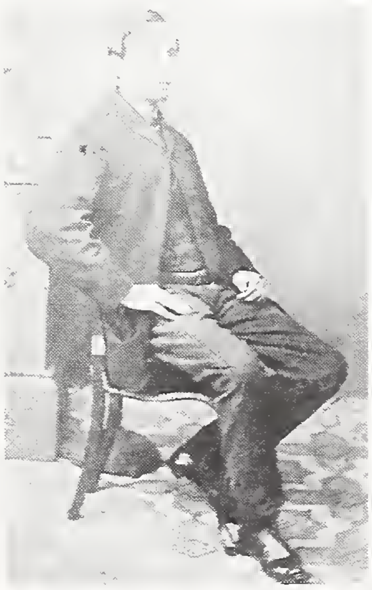
FIGURE 1. C. Healey

The founders of the Haggerstone Society were neither wealthy nor especially learned. We have portraits of five of them — Charles Healey (instigator, and first chairman and president, of the Society, Figure 1), William Gates (treasurer, Figure 2), Thomas Eedle (Figure 11), J. Bryant and A. Woodage — and of seven others who joined during the first eighteen months. They met weekly in a room over the Carpenters Arms, Martha Street, subscribing the modest sum of 1d a week. According to Gates, they were 'men of small means and entirely of the working class whose time and money are both limited'. This was largely true, although these early members did include a medical practitioner, J. S. Sequeira, and J. A. Clark, a pharmaceutical chemist, a most able administrator and subsequently a substantial benefactor of the Society.

FIGURE 2. W. Gates

FIGURE 3. E. Newman

The members' pennies allowed William Wood's *Index Entomologicus* (1839) to be purchased, and the new Society grew rapidly. Twenty-five years later, Gates recalled that in October 1859 'it being necessary to find a larger room . . . the Society moved its quarters to the Brownlow Arms and owing to the liberality of Mr Finch the late landlord in not charging rent . . . they were enabled to purchase a bookcase and cabinet.' The second item for the bookcase was the monthly periodical *Zoologist,* donated by its founder and editor Edward Newman, a leading naturalist of the mid nineteenth century and editor also of the *Entomologist* and the *Entomological Magazine.* Newman wrote widely on botany and ornithology, his books on ferns being particularly popular, and he corresponded with Charles Darwin about dimorphism in ants. In 1863 Newman read a paper to the Society on larval anomalies in the gipsy moth *Lymantria dispar* (Lymantriidae) and in 1869 applied to join; the Minutes record that 'it was an honour that seldom fell to the lot of Societys of working men to have such a man as Mr Newman to condesend to join them' (original spelling). His photograph (Figure 3), signed on the reverse, was presented by Healey in 1871, 'to stand first in the album', and though Newman rarely attended meetings his donations enriched the Society's library. After his death, many years passed before his equal as naturalist and scientist joined the Society, by then the City of London. With few exceptions, the Haggerstone entomologists were content with the pleasure of the chase, followed by a convivial evening exhibiting and discussing their captures.

## Sallowing and sugaring — the Haggerstone Society

Thus the 'cabinet', primarily of Lepidoptera though a few members collected beetles, was the focus of the weekly meetings. The greater the range of varieties and aberrations of some common moth or butterfly that a member could show, the better. There was animated discussion of the relative merits of fresh willow catkins ('sallowing') or treacle ('sugaring') for attracting moths (light-traps were introduced to Britain as late as 1866). Duplicates were exchanged and surplus specimens donated to the cabinet. What was not captured could be purchased, but prices (perhaps ten shillings for a British rarity) were out of most members' reach. The photographs include one of Edwin Birchall, first President of the Isle of Man Natural History Society. In 1863 he presented a box of moths, namely four and a half dozen of the burnet moth *Zygaena minos* (Zygaenidae) and five dozen *Lycia zonaria* (Geometridae), the belted beauty — 'a munificent gift', the minutes assert, as well they might, the latter being a scarce, extremely localized species while the former does not even occur in Britain. Thus in time the collection became quite valuable and Clark had the foresight, and means, to insure it, arranging a policy for £300 with the Liverpool, London & Globe Co.

Born in Aldermanbury in the City of London, John Adolphus Clark (Figure 4) grew up in Homerton, then well-known for its rose gardens, and collected 'all over Hackney, Clapton and Stoke Newington', winning a prize in 1864 for the best exhibit by a member under twenty-five. Elected president in 1876,

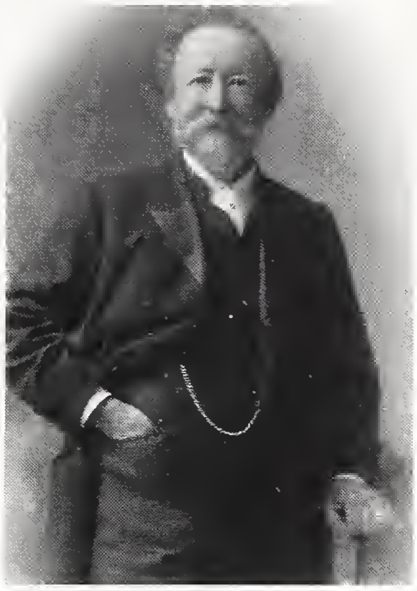

FIGURE 4. J. A. Clark

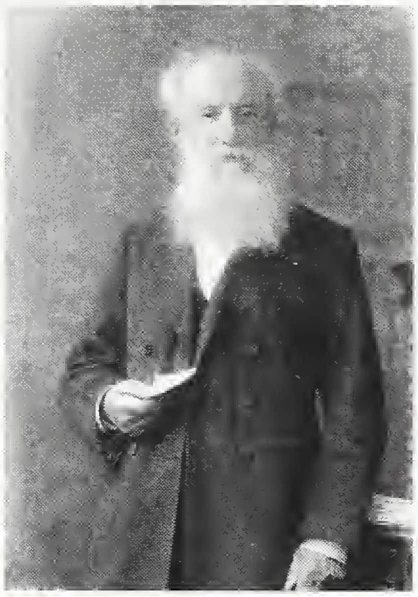

FIGURE 5. J. S. Sequeira

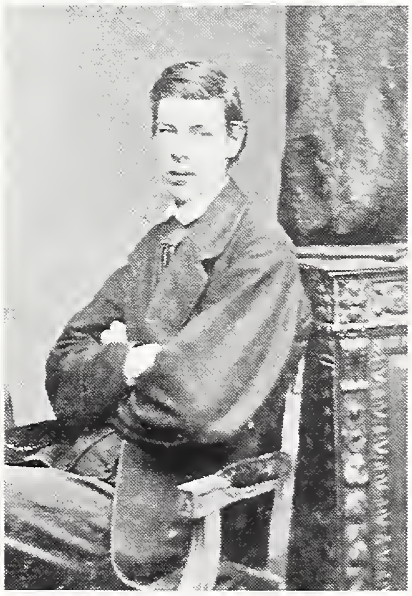

FIGURE 6. L. Lormier

following the resignation en masse of the officers when rule changes they had proposed were rejected, and president and treasurer from 1890–95, Clark guided and virtually bankrolled the Society through its leanest years; it was he who gave the album containing these portraits, and much else besides. Clark was vice-president from 1896 until he died, on the last day of 1908, from the after-effects of a brutal attack by pickpockets in Bethnal Green. Almost his last act, at the Society's meeting on 1 September 1908, was to present a copy of Joseph Greene's *The insect hunters' companion* to each member present. The photograph reproduced here shows Clark in his prime. For such a talented man, his contributions to science were few; all I have traced, other than two short papers in the Society's *Transactions* for 1892 and 1893, is a revision of *Acleris cristana* (Torticidae) and its varieties (*Entomologist's Rec. J. Var.* **13** (1902)).

James Scott Sequeira, his close friend for nearly fifty years, wrote Clark's obituary (*Entomologist's Rec. J. Var.* **21**: 22–24 (1909)). Despite losing his eyesight shortly thereafter ('all the extransient beauty of art and nature are now, to me, a sealed book . . .'), Sequeira continued to exhibit, and in 1911, at the age of eighty-three, delivered a thirty-page paper on collecting at that rich site for Lepidoptera, Wicken Fen. His patriarchal portrait (Figure 5) was taken in 1905.

Collecting for these men was fraught with difficulties, the law of trespass being fiercely enforced. Ernest Anderson advised members 'always go to localities where the keeper is absent', and in 1887 Mr Pearson was ordered off Epping Forest, then still in private hands, 'on account of having lanterns alight, but refused to go, arguing there had been a long history of collecting'. Infinitely more tragic is the fate that befell Lewis Lormier. A member for only four years, Lormier left England in 1873 for Madagascar. Twelve months later, the Minutes record that he had died there 'from the effect of burns accidentally incurred while collecting'. A note on the back of his photograph (Figure 6) records the month of his death as August 1873. Anderson himself emigrated to Australia where he discovered butterflies new to science. He sent reports to London, to be read at Society meetings, wrote articles for Melbourne newspapers, and co-authored, with Frank Spry, *Victorian butterflies and how to collect them*, whose 129 pages in two parts described seventy-two species (Kitching 1999); Anderson donated copies to the Society. His portrait (Figure 7) was taken in Melbourne in 1893.

Few members, however, could afford the time and cost of travel far from London. One who could was E. G. Meek (Figure 8), presumably a relative of the J. and W. Meek who were founder members in 1858. We know little of E. G., not even his dates, but he seems to have been a discriminating collector. He exhibited scarce species such as Barrett's marbled coronet *Hadena andalusica* ssp. *barrettii* (Noctuidae) taken in Ireland, and black forms of the noctuids

FIGURE 7. E. Anderson

FIGURE 8. E. G. Meek

FIGURE 9. T. Gurney

autumnal rustic *Paradiarsia glareosa* ssp. *edda* and coast dart *Euxoa cursoria* from Unst in the Shetlands. He, too, collected at Wicken Fen, and in 1884 captured a rare immigrant, the three-humped prominent *Notodonta tritophus* (Notodontidae), at Southwold, Suffolk (*Entomologist* **17**: 253 (1884)). His manuscript *Notes on the Sesia* (the hornet moth genus), a paper read to the Haggerstone and other Societies, is in the entomological collections of the Natural History Museum.

If, as seems likely, the Thomas Gurney who joined in 1877 (Figure 9) was the cabinetmaker of that name who traded in London Fields, Hackney (teste Colin Plant), the Society and its members would have had a ready source of high-quality entomological cabinets. Gurney was a regular exhibitor in the 1890s, and the Society's librarian for several years.

William Machin (Figure 10), a compositor by trade, was a successful breeder of microlepidoptera. As such he assisted the distinguished entomologist H.T. Stainton in the 1850s by collecting and rearing Tineinae, thus providing much of the source material for Stainton's great 13-volume *Natural history of the Tineina*, published in four languages between 1855 and 1873. Probably in the hope of building on this relationship, in 1860 the Society offered Stainton 'an address of thanks for his entomological work', a clumsy gesture which Stainton declined. Years later, under very different circumstances, Sir Henry Tibbats Stainton became a member of the City of London Society.

One founding member, Thomas Eedle (Figure 11) deserves special mention. Eedle was a taxidermist, a trader in natural history subjects and a man of unrivalled field-craft. Essentially, he was a professional collector of Lepidoptera. In 1868 and 1870 the Society paid his expenses for collecting in Rannoch, where he procured 146 specimens including the northern dart *Xestia alpicola* (Noctuidae), apparently only the second taken in Britain. In 1871–72 he accompanied Lord Walsingham, a hugely wealthy young man and an ardent entomologist, to California and Oregon, as 'collector and assistant'. The minutes for 27 April 1871 record that Eedle had arrived safely in New York 'after a troublesome voyage' and on 9 May 1872 reported his safe return from California. In September he presented a copy of Walsingham's *Directions for collecting microlepidoptera* (*The American Naturalist* **6**: 275–280 (1872)) to the Society, and subsequently arranged donations of other books and collections. In 1878 he collected for Walsingham again, at Wicken Fen, his captures including a long series of Camberwell beauty *Nymphalis antiopa*, said to be the largest in the country. There can be little doubt that Walsingham's magnificent collections, which form the basis of the Natural History Museum's holdings of Lepidoptera, were due in large part to Eedle. Though he published nothing, his

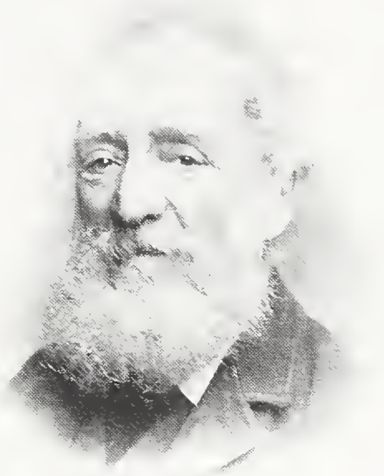

FIGURE 10. W. Machin

knowledge was encyclopaedic; he once remarked that he 'thought he knew a great deal more of many species than could be found in books'. As a professional amongst amateurs he was widely respected, for according to his obituarist, J.T. Carrington, 'he made his study his business, and never withheld a locality, nor a bit of useful knowledge, "for trade purposes"' (*Entomologist* **22**: 52 (1889)).

## Respectability — the City of London Society

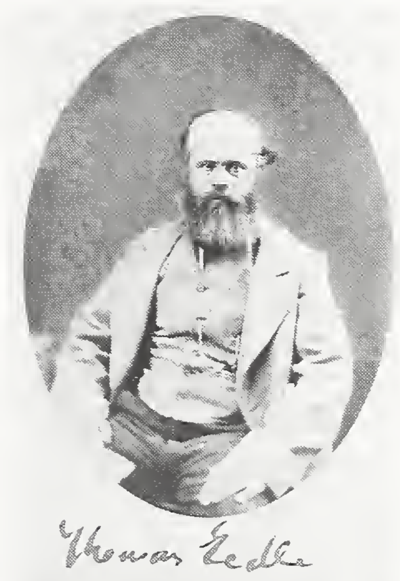

FIGURE 11. T. Eedle

In 1886, disillusioned with a declining, inward-looking membership, Anderson suggested amalgamation with another society, though nearly thirty years passed before this happened. A further concern was the effect on the Society's reputation of continuing to meet in a public house. The answer, proposed and implemented by the indefatigable Clark, was to move the meeting place to the better address of Albion Hall, London Wall, and to widen its appeal by changing the name to incorporate the words 'natural history'. Clark seems to have been on good terms with Sir John Lubbock, later Lord Avebury, scientist, politician, author and family friend of Charles Darwin. Lubbock facilitated the move to Albion Hall. The first meeting of the City of London Entomological and Natural History Society was held there on 6 October 1887, when Lord Walsingham consented to become patron of the reformed Society, and was elected an honorary member.

Thomas de Grey, sixth Baron Walsingham, had been elected a Fellow of the Royal Society in June 1887, on the basis, according to the citation, of his 'extensive private collection' of microlepidoptera (which he had gifted to the British Museum the previous month) and two publications in particular: *Illustrations of Lepidoptera Heterocera*, in *Catalogue of North American Tortricidae in the British Museum* (1879), and *On some probable causes of a tendency to melanic variation in Lepidoptera of high latitudes*, a presidential address to the Yorkshire Naturalists' Union (1885). His acceptance of the position of patron was perhaps his way of recognizing the debt he owed to Thomas Eedle, for his life-style and interests, apart from entomology, had little in common with those of the Society's ordinary members. Born in Mayfair (Walsingham House is now the Ritz Hotel), he was MP for West Norfolk from 1865 to1871, when he succeeded to the title, a trustee of the British Museum (1876) and High Steward of the University of Cambridge (1891). He was particularly fond of shooting, once killing 1,070 grouse in 14 hours 18 minutes. His marital infidelities, according to the present (ninth) Lord Walsingham, 'were remarkable, in an age when infidelity was commonplace; though the scandal was for the most part confined to the locality since it seems he usually slept with his housemaids'. Unusually, the Royal Society did not publish a biographical memoir of Walsingham after his death. His photograph, copied from newsprint, is too poor to reproduce.

With a noble lord as patron, and now meeting in respectable premises, the Society began to attract other eminent entomologists. Meetings became fortnightly. At the second, Sir John Lubbock (FRS 1858, Figure 12) consented to become an additional patron, and two weeks later Sir Henry Stainton (FRS

1867; Figure 13), having rebuffed the Haggerstone Society in 1860, 'acceded to a request that he should become a member'. Three Fellows of the Royal Society in one month! They were, of course, members in name only. Nearly thirty years would pass before the Society produced its first home-grown FRS.

One other member was elected at Albion Hall on 6 October 1887. James William Tutt (Figure 14) was born in Strood, Kent, on 26 April 1858, a few weeks before the Haggerstone Society itself. The triumvirate of Tutt and two others, C. R. N. Burrows and T. A. Chapman who joined a few years later, established the City of London as a scientific society, not just a collectors' club. Chapman's entomological discoveries were wider-ranging, and Burrows was the more skilled anatomist, but Tutt combined a gift for communicating with profound insights, much underestimated in his lifetime, into what we now call evolutionary biology, and it is these for which he deserves to be remembered.

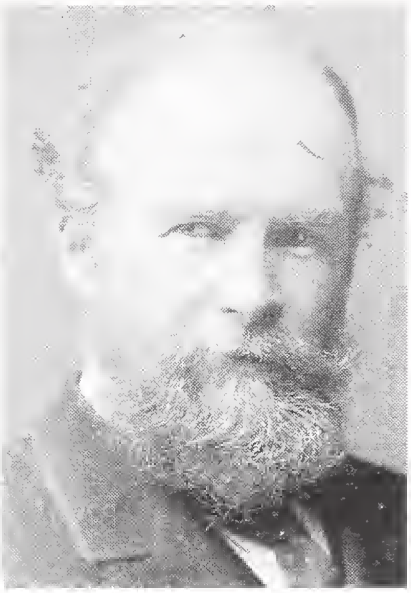

FIGURE 12.
Sir John Lubbock

FIGURE 13.
Sir Henry Stainton

FIGURE 14. J. W. Tutt

## Tutt and melanism

Tutt was a successful schoolmaster but entomology was his life. In 1890 he founded the *Entomologist's Record and Journal of Variation* which he edited until his death in 1911. He wrote over 900 articles, notes and reviews, while his books include *The British Noctuae and their varieties*, in four volumes (1891–92), *British moths* and *British butterflies* (both 1896), *Practical hints for the field lepidopterist*, in three volumes (1901–05), and the great nine-volume work, *A natural history of the British Lepidoptera* (1899–1914, the last volume published posthumously), as well as popular guides to collecting areas in Britain and abroad. He revised the British Pterophoridae, described many new species of *Cyaniris* (Lycaenidae), and is commemorated by *Megacraspedus tutti* (Gelechiidae), *Diachrysia tutti* (Noctuidae) and others. Tutt found his spiritual home in the City of London Society, of which he was president (1896–98) and vice-president (1891–95, 1899–1902). His portrait in the Natural History Museum is that in the Society's album.

Tutt was a committed Darwinist, his seminal contribution to science being to provide a perfect example of evolution by natural selection, taking place before our eyes. This is industrial melanism, the appearance of dark varieties of moth which, Tutt hypothesized, were better fitted to withstand predation pressure in an environment darkened by soot and smoke. He developed this idea gradually as a series of papers in his new magazine ('Melanism and melanchroism in British Lepidoptera', *Entomologist's Rec. J. Var.* 1: 5–7, and seriatim (1890–91)); at the end of 1891 he presented the complete forty-page article, subsequently published in book form, to the Society's library. During that year, to illustrate his theory, he exhibited 'very dark, almost black' specimens of great oak beauty

*Hypomecis roboraria* and twin-spot carpet *Perizoma didymata* (both Geometridae) from Liverpool. At the meeting on 2 May 1893 he stated his belief that 'melanism is due to natural selection, for protective purposes' and in 1896 (*British moths*, pp. 305–307) he explicitly proposed that melanism in the peppered moth *Biston betularia* (Geometridae) was an evolutionary adaptation to soot-covered trees, rendering the moth less noticeable to bird predators. Sixty years later, Bernard Kettlewell (1955, 1973) provided experimental proof of this hypothesis, though whether from ignorance or oversight he ignored Tutt's elegant and convincing formulation of it. Gradually doubts were cast on Kettlewell's results (at first by scientists critical of his methods and later by creationists anxious to attack evolution) but recent work by Michael Majerus (1998) including observational data acquired under carefully controlled conditions over many years (Majerus 2008) has wholly vindicated them. Owen (1997) gives a fuller account of Tutt's views on industrial melanism; it is the classic text-book example of Darwinian evolution in action.

Though he remained interested in the subject, exhibiting melanic specimens of scalloped hazel *Odontopera bidentata* (Geometridae) in 1902, and ruby tiger *Phragmatobia fuliginosa* (Arctiidae) in 1903, Tutt concentrated thereafter on his multi-volume survey of British Lepidoptera. His early death at his home in Blackheath, on 11 January 1911, before he could take up the Presidency of the London Entomological Society to which he had just been elected, deprived both that and the City of London Society of their leading scientist. The issue of his journal of 15 May that year was devoted entirely to tributes from twenty-six friends and fellow scientists, led by E. B. Poulton, Hope Professor of Zoology at Oxford (*Entomologist's Rec. J. Var.* **23**: 105–139 (1911)).

Tutt, it must be said, was respected and admired, but not always liked. He was 'a combative man' whose attacks on others' theories were sometimes seen, not without reason, as attacks on the theorizers. A proposal by the distinguished German entomologist Professor Weissmann that dark coloration can be produced by the action of cold he dismisses as 'a very far-fetched notion', Weissmann's experiments being 'of little or no value' (*Entomologist's Rec. J. Var.* **1**: 228–234 (1890)) — this was not his first criticism of Weissmann. In the same article, Tutt refers to Walsingham's presidential address to the Yorkshire naturalists in 1885: 'His paper can hardly be said to propound a theory, as it scarcely seeks to show what is the cause of melanism, but that, melanism once having been produced, the dark coloration is an advantage to the insect possessing it; it then goes on to suggest that this advantage, therefore, is the cause of the insect being melanic; although, how it can in any way be looked upon as a "cause" of melanism, I fail entirely to see. But we have to bear in mind that although the whole of Lord Walsingham's theory (?) that melanism is probably due to the rapidity with which insects would absorb heat because of their darker colouration, is extremely interesting and full of good reasoning, yet it is entirely misleading, because based on entirely fallacious data.' Since this address had been specifically cited in support of Walsingham's admission to Fellowship of the Royal Society, it would not be surprising if relations between Patron and ordinary member became cool; Walsingham's contribution to Tutt's obituary tributes, written from Villa Sans Souci in Monte Carlo, was polite but not effusive.

## The final years

In December 1891 the Society moved for the last time, to the London Institution in Finsbury Square, before amalgamating with the North London Society in 1914. By now several members, including some portrayed in the album, had interests beyond entomology. J. Riches, for example, was a gardener by profession, who exhibited plants and read a paper on

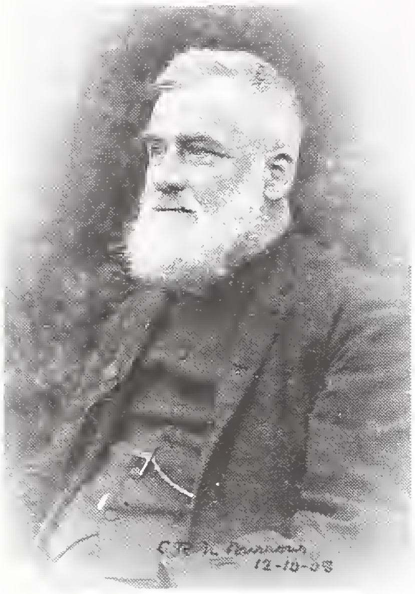

FIGURE 15.
C. R. N. Burrows

chrysanthemums, while the coleopterist Henry Hillman was responsible for some extraordinary exhibits — a collection of house crickets, the skulls of a dormouse and an extinct kangaroo, 'a bottle containing 3 pigeons from 2 eggs' and much more. But most members concentrated on Lepidoptera and tried to study them following the principles set forth by Tutt. Arthur W. Mera, president from 1903 to 1913 and subsequently a leading member of the LNHS, was one, though his interests were exclusively British and he published very little; his fine collection is now held by the Essex Field Club.

Charles Richard Nelson Burrows (Figure 15) was sometime curate of Haggerston (the final 'e' was lost around 1872) and subsequently vicar of Rainham, Essex. Before taking holy orders he trained as a chemist and then collected Lepidoptera for the British Museum, first in Natal (1873–75) and later in Manitoba, describing taxa new to science in *Annals and Magazine of Natural History* (4) **16** (1875). He joined the Society on New Year's Day 1895, having exhibited for several years, and was soon presenting 'instructive and amusing' papers on, for example, his experiences collecting large wainscot *Rhizedra lutosa* (Noctuidae) as well as detailed studies of geometrid moths such as Essex emerald *Thetidia smaragdaria* (probably now extinct in Britain), large emerald *Geometra papilionaria*, and the scarce small grass emerald *Chlorissa viridata*. Burrows dabbled in all things scientific, experimenting with the newly discovered elements radium and thorium, building crystal sets to receive early wireless transmissions, and, more relevant to the Society, pioneering colour photography. In March 1901, and again in May, he showed slides of Lepidoptera 'in their natural colours', the photographs taken and processed by himself using the Sanger-Shepherd process that had just come on the market. These were possibly the first true-colour natural history photos taken in Britain.

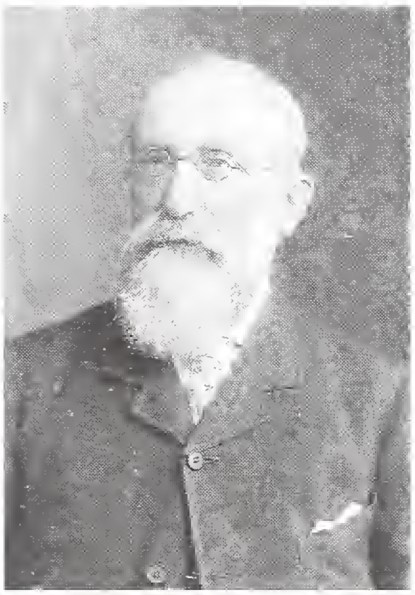

FIGURE 16.
T. A. Chapman

Burrows was an authority on the Psychidae and Geometridae. He was a superb microscopist, producing most of the illustrations for F. N. Pierce's *The genitalia of the British Geometridae* (1909), though he declined to be named co-author. (At a meeting where ferns were discussed, Burrows remarked 'ferns often hybridise in the prothallus stage'; if he had personally observed this, it suggests great patience as well as microscopic skill.) An admirer of Tutt, he described several new species of *Amphipoea* (Noctuidae) including Crinan ear *A. crinanensis* and several non-British species; Chapman named *A. burrowsi* after him. His collection is at the Natural History Museum.

On his retirement from medical practice in 1896, Thomas Algernon Chapman, 'the Doctor', moved to Reigate and joined all the local societies including the City of London. His obituarist W. G. Sheldon (*Entomologist* **55**: 44–48 (1922)) described Chapman (Figure 16) as 'One of the greatest and most scientific entomologists we have ever produced'. He was elected a Fellow of the Royal Society in 1918, the citation reading: 'Has made laborious and extended researches into the structure, habits and life-histories of insects (Coleoptera, Hymenoptera and especially Lepidoptera). The results are recorded in a long series of original papers published from 1868 onwards in the *Entomologist's Monthly Magazine*, the *Entomologist's Record*, and the *Proceedings* and *Transactions of the Entomological Society of London*, &c.'

He had a wider range of interests than his close friend Tutt, as the titles of some of his early papers in the *Entomologist's Monthly Magazine* suggest: 'The oviposition of *Octotemnus glabriculus* [a ciid beetle]' (*Ent. mon. Mag.* 5: 297 (1869)); 'The occurrence of chalcididdous larvae [parasitic wasps] in the imago of *Cynips*' (*Ent. mon. Mag.* **9**: 13 (1872)); 'The life-history of *Bombylius major* [bee-fly]' (*Ent. mon. Mag.* **14**: 196–208 (1878)). When Tutt brought out his new journal, Chapman became the most prolific contributor after Tutt himself, the very first article being Chapman's 'The genus *Acronycta* and its allies' (*Entomologist's Rec. J. Var.* **1**: 1–4, and seriatim (1890–91)). Many species of *Acronicta* (Noctuidae: this spelling has priority) exhibit melanism, and Chapman espoused Tutt's views on its origin.

Chapman was vice-president of the City of London Society from 1900 until 1913, when he proposed, and Burrows seconded, the motion to merge with the North London Society. A modest man, Chapman declined the presidency of the Entomological Society. He travelled extensively in Europe, often with Tutt, and thought nothing of walking forty miles a day. In the last year of the City of London Society he returned to one of its favourite haunts, Wicken Fen, where he collected the marsh dagger *Acronicta strigosa* (*Entomologist* **47**: 218–219 (1914)), a moth now extinct in Britain. Our photograph shows him in 1906, aged sixty-four.

Plant (1985) has indexed the papers published in the *Transactions* of the City of London Society, including six by Burrows, eleven by Chapman and thirteen by Tutt. With the merger came new faces, new interests and a new journal, *The London Naturalist* (known as the *Transactions of the LNHS* until 1922), which publishes obituaries of members, sometimes with photographs.

I hope this note, by bringing together portraits and contemporary accounts, does something similar for those who carried the Society through the first one third of its 150-year history.

## Appendix

Portraits in the photograph album of the City of London Entomological and Natural History Society. Square brackets show, in the case of members, date of joining the Society or its predecessor, the Haggerstone Entomological Society.

| | |
|---|---|
| Ernest ANDERSON | [1877] |
| Charles J. BIGGS | [1859] |
| Edwin BIRCHALL, F.L.S., 1819–1884 | [entomologist; Isle of Man] |
| Frederick BOND, F.L.S., F.Z.S., F.E.S., 1811–1889 | [entomologist; London] |
| P. BOULDEN | [1870] |
| J. BRAMLEY, d. 1884 | [1859] |
| J. BRYANT | [1858; president, 1859] |
| David BURNETT | [1873] |
| Revd Charles Richard Nelson BURROWS, 1851–1936 | [1895] |
| Roland BURRY, d. 1887 | [1868] |
| H. BUSH | [*c.* 1865] |
| Thomas Algernon CHAPMAN, M.D., F.R.S., F.Z.S., F.E.S., 1842–1921 | [1896] |
| John Adolphus CLARK, F.Z.S., F.E.S., M.P.S., L.D.S., 1842–1908 | [1863; president 1876, 1890–95] |
| J. A. COOPER | [1858] |
| William Hartley DANBY, 1850–1920 | [1870] |
| E. W. DAVIS, d. 1875 | [1868] |
| Thomas EEDLE, 1829–1888 | [1858] |
| William GATES, 1828–1900 | [1858] |
| Thomas GURNEY, b. 1843 | [1877] |
| W. HARPER, d. 1884 | [1858] |

| | |
|---|---|
| Charles HEALEY, d.1877 | [1858; first president, 1858] |
| Henry HILLMAN, F.Z.S. | [1871] |
| Gerald George C. HODGSON, 1860–1911 | [1905] |
| 'JEFFREY of Scarborough' | [no details traced] |
| C. A. Le PELLEY | [1870] |
| Lewis LORMIER, d. 1873 | [1869] |
| Sir John William LUBBOCK, P.C., F.R.S., 1st Baron Avebury, 1834–1913 | [patron, hon. member, 1887] |
| William MACHIN, 1821–1894 | [1858] |
| J. W. MACQUEEN | [*c.*1872] |
| John William MAY, F.E.S., 1814–1902 | [entomologist] |
| E. G. MEEK | [1869] |
| Arthur William MERA, 1849–1930 | [1887; president, 1903–13] |
| C. MILLER | [1858; president, 1860] |
| Edward NEWMAN, F.L.S., F.Z.S., F.E.S., 1801–1876 | [1869] |
| W. NORMAN | [no details traced] |
| G. PEARSON | [1878] |
| D. PRATT | [*ca* 1872] |
| John Marmaduke RAINE | [1879] |
| J. RICHES, 1848–1928 | [1891] |
| J. W. RUSSELL | [1876] |
| James Scott SEQUEIRA, M.D., 1828–1912 | [1859] |
| W. A. SOUTHEY | [*c.*1891] |
| Sir Henry Tibbats STAINTON, F.R.S., F.L.S., F.E.S., 1822–1892 | [hon. member, 1887] |
| James William TUTT, 1858–1911 | [1887; president, 1896-98] |
| J. W. VANDENBERGH | [1878; president, 1881] |
| Philip Henry VAUGHAN, 1846–1917 | [lepidopterist; Bristol] |
| WALSINGHAM, Lord Thomas de Grey, P.C., F.R.S., 1843–1919 | [patron, hon. member, 1887] |
| John Jenner WEIR, F.L.S., F.Z.S., 1822–1894 | [naturalist; London] |
| Thomas WILKINSON, 1818–1876 | [coleopterist; Scarborough] |
| A. WOODAGE | [1858] |

## References

KETTLEWELL, H. B. D. 1955. Selection experiments on industrial melanism in the Lepidoptera. *Heredity* **9**: 323–342.

KETTLEWELL, H. B. D. 1973. *The evolution of melanism*. Clarendon Press, Oxford.

KITCHING, R. L. 1999. *Biology of Australian butterflies*. CSIRO, Canberra.

MAJERUS, M. E. N. 1998. *Melanism: evolution in action.* OUP, Oxford.

MAJERUS, M. E. N. 2007. *The peppered moth: the proof of Darwinian evolution.* Presented at XI Congress of the European Society for Evolutionary Biology, Uppsala, August 2007. Transcript available at www.gen.cam.ac.uk/Research/majerus.htm

OWEN, D. F. 1997. Natural selection and evolution in moths: homage to J. W. Tutt. *Oikos* 78: 177–181.

PLANT, C. W. 1985. An index to the *Transactions of the City of London Entomological and Natural History Society*, 1892–1914. *Lond. Nat.* **64**: 95–101.

# Orthoptera in the Borough of Greenwich, south-east London, 1943–2005

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## Abstract

Details are presented of nine species of bush-crickets, crickets and grasshoppers (Insecta: Orthoptera) recorded in the London Borough of Greenwich since 1943. Of these, one, the short-winged cone-head *Conocephalus dorsalis* (Latreille), was only discovered in the Borough in 1985, and two others, Roesel's bush-cricket *Metrioptera roeselii* (Hagenbach) and the lesser marsh grasshopper *Chorthippus albomarginatus* (De Geer) are currently extending their ranges. Completely black morphs of the field grasshopper *Chorthippus brunneus* (Thunberg), which once formed a significant proportion of the population, have apparently disappeared since the introduction of the smokeless zone in London after 1952.

## Introduction

During the years 1943–1959, when I lived in the Borough of Greenwich, and on subsequent visits, I kept a record of the bush-crickets, crickets and true grasshoppers that I found there, especially in the latter years. The following account of these is supplemented with more-recent records from other sources. All records are those of the author unless otherwise stated. The nomenclature used is that employed by Marshall and Haes (1988).

An excellent, well illustrated (colour photographs) account of the geology, soils and topography of the Borough is given in Swales et al. (1989). In addition, detailed descriptions, with maps and photographs, of the habitats in the Blackheath and Greenwich Park area have been published by Grant (1967), Rhind (1987), Teagle (1997) and Burton (2001). I also gave a description of the habitats of the Shooters Hill and Woolwich Common area in an earlier paper (Burton 1992), supplementing those of Milner (1988) and Swales et al. (1989). Descriptions of Plumstead Marshes as they used to be before the construction of the new town of Thamesmead, and subsequently, can be found in Burton (1979), English (1986) and Wheatley (1991). In the past the term Plumstead Marshes often referred to the whole of the Thames-side marshes from Woolwich to Erith. For my own convenience, when I lived in the area, I subdivided them into Plumstead Marshes (Woolwich to Abbey Wood Railway Station), Abbey Wood Marshes (eastwards to Belvedere Railway Station), Erith and Belvedere Marshes (eastwards to the town of Erith), and usually used these divisions in my journals and earlier publications. Apart from the area formerly occupied by the Woolwich Arsenal, my old subdivision of Plumstead Marshes is now largely occupied by Thamesmead. When I lived at Greenwich in the 1940s and 1950s, the Woolwich Arsenal was, of course, out of bounds to members of the general public and I could only glimpse parts of the remaining marshland from the top of the high Outfall Sewer bank. I often wondered what wildlife riches were still to be found there.

## The Orthoptera

### TETTIGONIIDAE

*Meconema thalassinum* (De Geer) Oak bush-cricket

Paul (1995) reported finding this species numerous at several locations in London, including Greenwich Park, where Sandi Bain swept one from an oak in 2001 (Mills 2001). I found it plentiful on oaks and other broad-leaved trees in Oxleas Wood on Shooters Hill in the late 1940s and in the 1950s (Burton 1992).

*Tettigonia viridissima* (Linnaeus) Great green bush-cricket

In the late 1940s and 1950s, as reported in Payne (1958), I found this large bush-cricket to be numerous on all the Thames-side marshes from Woolwich to Swanscombe, and especially so on those between Woolwich and Erith (Burton 1959, 1960, 1961). R. G. Rigden (Payne 1958) found it also on waste ground at Plumstead. In 1985, English (1986) reported that it was common around Thamesmead New Town on the former Plumstead Marshes and was even increasingly spreading into the town itself via the shrubberies along the Eastern Way and the edge of Southmere and Crossway Parks. Although just outside the north-eastern Greenwich Borough boundary, hundreds were heard by Paul (1995) stridulating on waste ground on Erith Marshes.

*Metrioptera roeselii* (Hagenbach) Roesel's bush-cricket

As I reported to Payne (1958), I found this species commonly in the Thames marshes from Abbey Wood Railway Station eastwards in the late 1940s and the 1950s, as did R. G. Rigden at Plumstead Common in the mid 1950s. In these two decades it was also present in small numbers on the rough, grassy areas of Shooters Hill Golf Course and its margins. In 1985, English (1986) reported that the species was common over much of the former Plumstead Marshes, including the vicinity of Thamesmead New Town. There it occurs in sheltered sunny situations amongst long grass and herbage, and along the Thames shore in thickets of sea aster *Aster tripolium*. As mentioned by Paul (1995), this bush-cricket is undergoing a spectacular increase in range and numbers in England, apparently due to the current climatic warming, and is now the most common and widespread bush-cricket in the London Area.

*Conocephalus dorsalis* (Latreille) Short-winged cone-head

Although I searched for it in the 1950s, I never succeeded in finding this small bush-cricket on the former Plumstead Marshes. However, in 1985 English (1986) located a small population in a polluted and overgrown ditch along Woodland Way at Thamesmead, apparently its only known site on these marshes. Farther east along the Thames it used to be present on the Dartford and Stone Marshes (Payne 1958) and is abundant on the Essex side at Rainham and Wennington Marshes (Paul 1995).

*Leptophyes punctatissima* (Bosc) Speckled bush-cricket

R. G. Rigden recorded this wingless bush-cricket at Plumstead in the 1950s (Payne 1958). On Shooters Hill in that decade it was plentiful in nettle beds, bramble thickets and other suitable vegetation at the edges of Oxleas Wood and other woodlands there, including those fragments on the golf course (Burton 1992). In 2001, Sandi Bain (Mills 2001) swept a specimen from an oak in Greenwich Park.

## GRYLLIDAE

*Acheta domesticus* (Linnaeus) House-cricket

In the 1940s and 1950s this alien species was numerous in the flower nurseries and older buildings of Greenwich Park, also in the built-up areas of the Borough, including Blackheath, Charlton and Woolwich. At Plumstead Marshes on 5 August 1957 I heard five house-crickets stridulating close to the North Kent railway track. On lifting up a large tuft of grass growing against the stonework of a small bridge over a ditch I found a pair of adults and several nymphs beneath it.

## ACRIDIDAE

*Chorthippus brunneus* (Thunberg) Field grasshopper

In the 1940s and 1950s this was the only acridid grasshopper to be found at Blackheath and in Greenwich Park. In the Park it was virtually confined to the Wilderness and the Superintendent's paddock where it was common and, in some favourable years, especially so. It was also very numerous on the adjacent parts of Blackheath and continues to be so at the present time, frequenting dry grassy places and bare pebbly ground, particularly in the north-east corner of the heath where gorse is present. This was the case when I visited that part of the Heath in August 1983 and the summer of 1989 (Burton 1993). In the summer of 1994, Paul (1995) noted the species in both Greenwich Park and on Blackheath.

In Greenwich Park on 6 and 13 August 1950 I found many hundreds of dead and dying *brunneus* clinging to the tall flower spikes of the grass in the Wilderness and the adjoining paddock. They had been attacked by a fungal parasite, *Entomophthora* sp., which is specific to grasshoppers (Richards and Warloff 1954). Many of them were half-eaten by wasps *Dolichovespula* spp., and I watched these insects chewing off and carrying away large pieces of the unfortunate grasshoppers. In that year *brunneus* was particularly abundant; the following year it was much less so and I detected no sign of it suffering from the fungus, nor did I in subsequent years.

As is usual with this species, several colour varieties occurred both on the Heath and in the Park, including a sizeable proportion (about 5 per cent in 1959) of melanic (black) forms (Burton 1960). However, completely black individuals had apparently disappeared when I sampled the population in the summer of 1989, although blackish-grey individuals amounted to 3 per cent. In the 1950s pollution in south-east London made the grass and soil rather sooty in open areas like Blackheath and the black morphs were presumably at some advantage in such situations. It seems that the success of the smokeless zone introduced in the London area after 1952, which produced a marked reduction of smoke pollution, had led to the disappearance of such very black morphs by the late 1980s. Other localities where I found completely black morphs were at Charlton and on the Thames-side marshes from Woolwich to Greenhithe.

Elsewhere in the Borough of Greenwich in the 1950s I found flourishing populations of field grasshoppers almost wherever there was suitable waste ground: on bomb sites elsewhere in the Blackheath district, at Charlton, including the Charlton Sandpit, and on the Thames-side marshes at Plumstead and Abbey Wood. On Shooters Hill the species was fairly numerous in suitable parts of Oxleas Meadow and in a few grassy clearings in Oxleas Wood; also in open, grassy places amongst oaks and birches on the lower slopes of Eltham Common. It was also locally common in dry grassland on parts of Shooters Hill Golf Course (Burton 1992).

### *Chorthippus parallelus* (Zetterstedt) Meadow grasshopper

I never found this common species either in Greenwich Park or on Blackheath although I looked out for it, and Paul (1995) did not find it either. However, in the summer of 2001, Sandi Bain (Mills 2001) found it present in the long grass in the same location in Greenwich Park as the lesser marsh grasshopper. How it and *albomarginatus* got there is something of a mystery.

Elsewhere in the Borough I found the meadow grasshopper to be numerous in the 1950s in the areas of lusher grass on Shooters Hill Golf Course before these were eventually incorporated into extensions of the playing areas; also in the Thames-side marshes from Abbey Wood eastwards. In the mid-1950s R. G. Rigden (Payne 1958) reported its presence at Plumstead.

### *Chorthippus albomarginatus* (De Geer) Lesser marsh grasshopper

Before 1983 I had never seen this species on Blackheath, but in August that year (only my third visit since 1959) I was surprised to discover that it had colonized the relatively flat expanse of dry grassland between the Maze Hill wall of Greenwich Park and the deep Vanbrugh Pit in the north-east corner of the Heath, plus a small grassy area on the other side of the busy road that forms its southern boundary. Up to 1959 at least, only the field grasshopper *C. brunneus* was present there and, although still very plentiful, it tends nowadays to be outnumbered by *albomarginatus*.

On my next visit to Blackheath on 30 June 1989, during one of my annual visits to the U.K. from my German home, I spent two and a half hours in hot sunshine investigating the populations of these two species. I estimated that *albomarginatus* outnumbered *brunneus* by about three to one. I made another visit to Blackheath later that year, on 7 September 1989, and spent another two hours or so, again in hot sunshine, looking specifically at the grasshoppers. On this occasion, more of the *brunneus* were mature than they were in June, and I considered that they was present in roughly equal numbers with *albomarginatus*. The latter were now largely confined to the longer, lusher grass growing on more neutral soil in the otherwise acid grassland (Burton 1993).

In the summer of 1994, Paul (1995) also observed *albomarginatus* on Blackheath. Then, in the summer of 2001, Sandi Bain was reported (Mills 2001) to have found many in long grass on the north-east-facing slope below the tumuli and towards Lovers Walk in Greenwich Park. I used to find this grasshopper abundantly in the

Thames-side marshes as far west as Woolwich and it may well have also occurred on the grassy parts of the nearby, heavily industrialized Greenwich Marshes; so it is possible that it may have found its way into the Park from there and then on to Blackheath. The lesser marsh grasshopper is one of those several species of Orthoptera which have been expanding their ranges in England since the 1970s, apparently in response to the global warming (Burton 1991, 1993).

## References

BURTON, J. F. 1959. Notes on Orthoptera for 1958 from Breconshire, Kent and Oxfordshire. *Entomologist's Rec. J. Var.* **71**: 76–77.

BURTON, J. F. 1960. Notes on Orthoptera in S.E. England in 1959. *Entomologist's Rec. J. Var.* **72**: 68–71.

BURTON, J. 1961. Two marshland grasshoppers. *The Countryman* **66**: 257–261.

BURTON, J. F. 1979. When Thamesmead was a reed-bed. *Country Life* **CLXVI**: 1767–1768.

BURTON, J. F. 1991. British grasshoppers and bush-crickets may be responding to the 'Greenhouse' warming. *Country-side* **27**: 29–31.

BURTON, J. F. 1992. Notes on the fauna and flora of Shooters Hill, including Oxleas Wood SSSI, with particular reference to the years 1943–1958. *Lond. Nat.* **71**: 75–115.

BURTON, J. F. 1993. Colonisation of Blackheath, south-east London by *Chorthippus albomarginatus* (De Geer) (Orth.: Acrididae) *Entomologist's Rec. J. Var.* **105**: 190–192.

BURTON, J. F. 2001. A history of the vertebrate fauna of Blackheath and Greenwich Park, 1850–1999. *Lond. Nat.* **80**: 43–98.

ENGLISH, P. 1986. The bush-crickets of Thamesmead. *Lond. Nat.* **65**: 179–180.

GRANT, P. J. 1967. The birds of Greenwich Park and Blackheath. *Lond. Bird. Rep.* **31**: 64–92.

MARSHALL, J. A. and HAES, E. C. M. 1988. *Grasshoppers and allied insects of Great Britain and Ireland.* Harley Books, Colchester, Essex.

MILLS, A. 2001. *Friends of Greenwich Park Newsletter* No. **29** (Winter 2001).

MILNER, J. E. 1988. Oxleas Wood: observations on the spiders, their phenology and ecological strategies. *Lond. Nat.* **67**: 97–118.

PAUL, J. 1995. Orthoptera in the London Archipelago. *Entomologist's Rec. J. Var.* **107**: 89–95.

PAYNE, R. M. 1958. The distribution of grasshoppers and allied insects in the London Area. *Lond. Nat.* **37**: 102–115.

RHIND, N. 1987. *The Heath.* Bookshop Blackheath Ltd, Blackheath, London.

RICHARDS, O. W. and WARLOFF, N. 1954. Studies on the biology and population dynamics of British grasshoppers. *Anti-Locust Bull.* **17**: 182 pp.

SWALES, S., GAME, M. and YARHAM, I. 1989. *Nature Conservation in Greenwich.* Ecology Handbook No. 10. London Ecology Unit, London.

TEAGLE, W. G. 1997. Blackheath in the 1950s and 1960s. *Lond. Nat.* **76**: 83–103.

WHEATLEY, N. 1991. The birds of Thamesmead. *Lond. Bird Rep.* **55**: 164–180.

# London butterfly monitoring report for 2007

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## Abstract

Butterflies were monitored at a number of sites in London in 2007 by the transect walks method. Collated indices for species were calculated using the data from 2007 in comparison with previous years. Records from other sites in London are also presented.

## Introduction

Monitoring of butterflies was undertaken by a standard method at sites in London in 2007. These provided data for the preparation of collated indices for changes in the abundance of butterfly species in London as compared with previous years. London is defined for the purposes of this paper as Greater London or the area encompassed by the London boroughs, though additional records from the wider London Natural History Society (LNHS) recording area are noted.

## Methods

Monitoring was undertaken by the transect walk method, a standard method adopted throughout the United Kingdom. Details of the method are described elsewhere (see Pollard and Yates 1993, Williams 2000, and the UK Butterfly Monitoring Scheme at www.ukbms.org). Basically, at each site a walk was undertaken along the same route, each week, between April and September inclusive, within a standard range of weather conditions conducive to butterfly flight. Counts were made of the number of adult butterflies observed to provide a total for each species for the year at each transect. Totals used for this paper include calculated estimates for weeks missed due to poor weather or the unavailability of the recorders. However, for inclusion in the index, data from each transect needs to have been obtained with good coverage during the recording season and with the minimum of missed weeks. To contribute to the indices, data from each transect must be available for at least two years, though these do not need to be consecutive. Collated indices were calculated from the data as described by Williams (2000), but see also Crawford (1991) for an introduction to the use of collated indices in wildlife monitoring; and also Pollard and Yates (1993) and Roy and Rothery (2002). Note that neither the original site counts nor the collated indices are absolute counts of the population, but indices of abundance for each species over a number of years. Estimates of the relative changes in the populations of each species from year to year are given by the difference in the indices. For example, a species with an index of 50 in one year and 25 in the following year would have had approximately half the adult population in the second year as compared with the first year. Indices have been rounded to the nearest whole number and have usually been set at 100 in 1990 or the first year of record: for a technical discussion see Crawford (1991). Reliability of indices increases with the number of transects; in the earlier years these were relatively few, e.g. one transect was walked in 1978, two in 1986, three in 1988 and eight in 1990.

Reliability of the indices may be lower for species with low counts and/or local distribution in London. The 'Total count on transects' provides an indication of the size of the count from which the analysis was made in 2007 using the data from the complete transects for that species, including estimated counts for missing weeks, but excluding the computed estimated counts for transects that were not walked or had insufficient data in 2007.

Transects that contributed data in 2007, the years for which data were available and the Borough in which the transect is located, were: **Hampstead Heath** (Camden) 1978–2007, **Fryent Country Park** (Brent) 1986–2007, **Beane Hill** (Brent) 1988–2007, **Gutteridge Wood** (Hillingdon) 1990–2007, **Mitcham Common 'route A'** (Merton) 1994–2001, 2003–2007, **Mitcham Common 'route B'** (Merton) 1995–2007, **Wildfowl and Wetlands Trust Wetland Centre at Barn Elms** (Richmond upon Thames) 1996–2007, **Railway Fields** (Haringey) 1997–2007, **Hutchinson's Bank Nature Reserve** (Croydon) 1997–2007, **South Norwood Country Park** (Croydon/Bromley) 1998–2007, **Tower Hamlets Cemetery Park** (Tower Hamlets) 1999-2007, **Gunnersbury Triangle** (Hounslow) 1999–2007, **Brent Reservoir** (Barnet/Brent) 2000–2007, **Featherbed Lane Roadside Verge** (Croydon) 2000–2003, 2006–2007, **Regents Canal towpath from Mile End Road to Mare Street** (Tower Hamlets/Hackney) 2001–2007, **Kenwood Estate** (Camden) 2005–2007, **Horsenden Hill East** (Ealing) 2005–2007, **Horsenden Hill West** (Ealing) 2005–2007, and **Perivale Wood** (Ealing) 2005–2007. Recorders for 2007 are listed in the Acknowledgements.

Partial data for 2007 was available for the transect at **Chapel Bank** (Croydon). Indices include data from some sites for 2006 and for earlier years that were not available at the time that the 2006 indices were prepared.

## Results

The order and nomenclature of the species accounts follow Asher et al. 2001. The species accounts are based on the collated indices, which for the years 1997 to 2007 are presented in Table 1. Since some year to year variations are to be expected, the comments below are focused on the more pronounced changes or on longer term trends.

### SMALL SKIPPER *Thymelicus sylvestris* and ESSEX SKIPPER *Thymelicus lineola*

Small and the Essex skippers are often counted together by transect walkers due to the difficulty of separating these species in flight. They are species of rough grassland habitats and this is reflected in the numbers recorded from different transect sites. At eight transects attempts were made to identify some individuals to the two species separately. Of 209 skippers, 75 per cent (156) were identified as small skippers, and 25 per cent (53) as Essex skippers. However, at Tower Hamlets Cemetery Park, 21 per cent (8) were small skippers, and 79 per cent (31) were Essex skippers. Total count on transects: 1,278.

### LARGE SKIPPER *Ochlodes sylvanus*

A species of grassland with scrub, the index was the lowest since 2001. Total count on transects: 262.

### DINGY SKIPPER *Erynnis tages*

At Hutchinson's Bank the count was the lowest since the transect commenced in 1997. Dingy skippers were also recorded at Chapel Bank. Total count on transects: 11.

### GRIZZLED SKIPPER *Pyrgus malvae*

The grizzled skipper was recorded at Hutchinson's Bank; and also at Chapel Bank. Total count on transects: 11.

CLOUDED YELLOW *Colias croceus*

After the widespread migration of 2006, only a single clouded yellow was recorded on a transect in 2007, at the London Wetland Centre at Barn Elms. Elsewhere in London there were records by Miss D. G. Carr of one at Wimbledon Common (TQ229727) on 26 August 2007; by Stephen Spooner from the Walton Reservoir in early September and on 3 October 2007; and by Robert Callf at Williams Wood (TQ301979) on 6 September 2007. Total count on transects: 1.

BRIMSTONE *Gonepteryx rhamni*

Brimstones were recorded all but one transect. Planting of the larval foodplants, particularly alder buckthorn *Frangula alnus*, continued at some sites in north London during the year to increase the potential stock of these trees in future years. Total count on transects: 341.

LARGE WHITE *Pieris brassicae*

This species was widely distributed in London though counts were lower at almost all of the transect sites and the overall index was about half that of 2006. The index was the lowest since 1996. Total count on transects: 357.

SMALL WHITE *Pieris rapae*

The small white was widely distributed in London; and with an index similar to that for 2006. Total count on transects: 1,846.

GREEN-VEINED WHITE *Pieris napi*

The index for this widely distributed species was amongst the lowest of the years since transect monitoring commenced in London. Total count on transects: 751.

ORANGE TIP *Anthocharis cardamines*

Much of the total count was from transect sites with damp grasslands. The index was the lowest since 1996. Total count on transects: 143.

GREEN HAIRSTREAK *Callophrys rubi*

There were transect records from Hutchinson's Bank, Mitcham Common Route A, and Featherbed Lane Roadside Verge. Records were also received from Chapel Bank. Total count on transects: 4.

PURPLE HAIRSTREAK *Neozephyrus quercus*

Recorded on nine transects, and with the majority of records from the Kenwood Estate, Mitcham Common route A, Brent Reservoir and Horsenden Hill East transects. Purple hairstreaks generally fly in the evening and were possibly more frequent and widespread than suggested by the daytime transects, particularly where there are oak trees and woodland with oak. Elsewhere in London there were records from Kew Gardens and from Trent Park. Total count on transects: 66.

WHITE-LETTER HAIRSTREAK *Satyrium w-album*

Following the relatively high indices in 2005 and 2006, numbers were lower in 2007. White-letter hairstreaks were recorded at the Horsenden Hill East, Horsenden Hill West and at the nearby Perivale Wood transects. Elsewhere in London there were records from Trent Park and at Enfield Grammar School Playing Field (TQ327969). Total count on transects: 8.

TABLE 1. Collated indices for butterfly species in London, 1997-2007. Indices have been rounded to the nearest whole number and have usually been set at 100 in 1990 or the first year of record, though indices may be set at 100 in other years or at a different figure where this aids interpretation. A blank indicates that the species had not yet been recorded on any transect in London. A zero indicates that a species was not observed on transects in that year but had previously been observed on a transect in London. A question mark indicates that a species was present in that year, but that there was insufficient data to calculate and index.

| | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Small and Essex skippers | 161 | 92 | 98 | 82 | 97 | 75 | 80 | 83 | 89 | 82 | 76 |
| Large skipper | 64 | 42 | 61 | 56 | 41 | 72 | 101 | 68 | 70 | 52 | 44 |
| Dingy skipper | 100 | 58 | 51 | 63 | 33 | 46 | 117 | 77 | 53 | 27 | 14 |
| Grizzled skipper | 100 | 25 | 63 | 28 | 16 | 48 | 41 | 81 | 21 | 26 | 45 |
| Clouded yellow | 0 | 109 | 0 | 2,255 | 0 | 62 | 114 | 118 | 0 | 554 | 29 |
| Brimstone | 96 | 85 | 81 | 127 | 97 | 96 | 85 | 124 | 119 | 111 | 103 |
| Large white | 144 | 282 | 122 | 129 | 111 | 175 | 119 | 145 | 171 | 155 | 83 |
| Small white | 329 | 169 | 94 | 139 | 122 | 154 | 176 | 260 | 211 | 191 | 199 |
| Green-veined white | 138 | 187 | 91 | 97 | 62 | 99 | 77 | 99 | 66 | 58 | 52 |
| Orange tip | 82 | 67 | 49 | 79 | 65 | 80 | 44 | 67 | 83 | 54 | 39 |
| Green hairstreak | 75 | 38 | 19 | 17 | 66 | 45 | 57 | 71 | 39 | 28 | 25 |
| Purple hairstreak | 230 | 390 | 358 | 386 | 260 | 429 | 265 | 391 | 606 | 433 | 409 |
| White-letter hairstreak | 70 | 32 | 10 | 10 | 22 | 13 | 15 | 10 | 44 | 60 | 13 |
| Small copper | 71 | 60 | 46 | 25 | 6 | 4 | 68 | 60 | 24 | 53 | 57 |
| Small blue | 100 | 225 | 175 | 188 | 338 | 0 | 38 | 25 | 25 | 463 | 288 |
| Brown argus | 101 | 10 | 11 | 18 | 6 | 7 | 41 | 39 | 12 | 38 | 41 |
| Common blue | 85 | 44 | 86 | 70 | 43 | 43 | 142 | 65 | 53 | 122 | 38 |
| Chalkhill blue | 288 | 75 | 180 | 90 | 80 | 41 | 41 | 93 | 29 | 129 | ? |
| Holly blue | 21 | 70 | 40 | 47 | 56 | 43 | 46 | 66 | 76 | 43 | 78 |
| White admiral | | 100 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | 0 |
| Purple emperor | | | | | | | | | 100 | 0 | 0 |
| Red admiral | 104 | 141 | 128 | 264 | 195 | 209 | 423 | 134 | 167 | 384 | 400 |
| Painted lady | 12 | 7 | 10 | 63 | 8 | 74 | 382 | 39 | 3 | 212 | 35 |
| Small tortoiseshell | 305 | 184 | 152 | 72 | 42 | 25 | 66 | 144 | 53 | 27 | 10 |
| Peacock | 793 | 1,142 | 1,125 | 1,518 | 1,081 | 655 | 404 | 604 | 525 | 318 | 447 |
| Comma | 128 | 134 | 118 | 204 | 152 | 135 | 205 | 149 | 121 | 220 | 117 |
| Dark green fritillary | 100 | 148 | 181 | 63 | 7 | 11 | 91 | 9 | 4 | 0 | ? |
| Silver-washed fritillary | | | 100 | 300 | 100 | 0 | 0 | 0 | 125 | 500 | ? |
| Speckled wood | 122 | 144 | 165 | 179 | 150 | 209 | 234 | 143 | 150 | 132 | 133 |
| Wall brown | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Marbled white | 100 | 61 | 54 | 40 | 15 | 18 | 37 | 26 | 14 | 37 | 33 |
| Gatekeeper | 138 | 107 | 152 | 165 | 144 | 138 | 177 | 228 | 277 | 221 | 190 |
| Meadow brown | 116 | 163 | 152 | 149 | 94 | 68 | 141 | 114 | 155 | 135 | 76 |
| Ringlet | 231 | 305 | 362 | 481 | 244 | 295 | 403 | 227 | 162 | 208 | 159 |
| Small heath | 22 | 16 | 3 | 2 | 1 | 1 | 8 | 7 | 9 | 11 | 13 |

SMALL COPPER *Lycaena phlaeas*

Recorded on over half of the transects, the highest counts were at Mitcham Common, Horsenden Hill and Kenwood which have areas of semi-natural grasslands. Elsewhere in London there were records of from Richmond Park and at Trent Park. Total count on transects: 221.

SMALL BLUE *Cupido minimus*

All of the transect counts were from the chalk downland site of Hutchinson's Bank Nature Reserve. Total count on transects: 23.

BROWN ARGUS *Aricia agestis*

Transect records were from five sites including South Norwood Country Park, Mitcham Common, Hutchinson's Bank and Horsenden Hill West. Elsewhere in London there were records from Trent Park and Chapel Bank. Total count on transects: 23.

COMMON BLUE *Polyommatus icarus*

The index was the lowest since 1993 though only slightly lower than in 1998, 2001 and 2002. Although recorded from the majority of transects in 2007, the majority of the total count was from two sites. Total count on transects: 213.

HOLLY BLUE *Celastrina argiolus*

Recorded on all but one transect. The index was higher than in 2006. Total count on transects: 453.

WHITE ADMIRAL *Limenitis camilla*

White admirals were observed by Dave Chandler at Ruislip Woods on 24 June 2007, and three were recorded at Bookham Common on 14 July 2007. Total count on transects: 0.

PURPLE EMPEROR *Apatura iris*

A female found by Mrs Anne Rose on 11 July 2007 squashed on the pavement of Bell Yard, London WC2 near to the High Court was identified by Tim Freed. It is possible that this was the same large, dark butterfly that was seen flying at that location a few days earlier. Two purple emperors were recorded at Bookham Common on 14 July 2007. Total count on transects: 0.

RED ADMIRAL *Vanessa atalanta*

The index for this widespread species remained relatively high compared with most years since transect monitoring commenced in London in 1978. Records continue to be received for the red admiral in flight during most months of the year, and in 2007 for all months from January to November. Total count on transects: 275.

PAINTED LADY *Vanessa cardui*

Following the migration of 2006, numbers were much lower. Total count on transects: 30.

SMALL TORTOISESHELL *Aglais urticae*

The decline continued in London. The index was the lowest since transect monitoring commenced in London in 1978, and it was recorded on only nine of the nineteen transects. Four of the sites with zero counts were Hampstead Heath, Fryent Country Park, Beane Hill and Gutteridge Wood, which in 1992, the peak year since 1978, had transect counts of 66, 131, 259 and 10 respectively. The London index for 2007 was less than one hundredth of that in 1992. At Vicarage Farm (TQ305975), Enfield, an over-wintered small tortoiseshell was observed by Robert Callf on 13 March 2007 and the last 2007 record there was on 22 July. Numbers of the second generation appeared to be particularly low though one was reported on 14 October 2007 at Horsenden Hill West by Andrew Culshaw. Beyond London, the transect results to 2006 suggested that the small tortoiseshell had declined in Hertfordshire in addition to Middlesex (Wood and Murray 2007). The UK Butterfly Monitoring Scheme reported that though there had been large fluctuations in abundance since 1976, there appeared to have been a more cyclic pattern since the late 1980s but overall a decline and with the 2006 index at the lowest since monitoring commenced in 1976 (Greatorex-Davies et al. 2007). Total count on transects: 29.

### PEACOCK *Inachis io*

Recorded on all but one transect, the index was higher in 2007 than for the relatively low of 2006. Total count on transects: 366.

### COMMA *Polygonia c-album*

The index in 2007 was at a relative low for this species, though it was recorded on all but one transect. Total count on transects: 279.

### DARK GREEN FRITILLARY *Argynnis aglaja*

One was recorded at Chapel Bank though the data from that site in 2007 have not been included in the indices. Martin Wills reported this species from the wider LNHS area at the Lullingstone golf course site. Total count on transects: 0.

### SILVER-WASHED FRITILLARY *Argynnis paphia*

There were records of one at Wimbledon Common (TQ226728) on 26 June 2007 by D. G. Carr; approximately fifteen from Bookham Common on 14 July 2007; and four were at Chapel Bank, but it was not possible to include the transect results in the index due to the high proportion of missing weeks. Total count on transects: 0.

### SPECKLED WOOD *Pararge aegeria*

The index has been relatively stable since 2004 but higher in 2002–2003. Total count on transects: 1,454.

### MARBLED WHITE *Melanargia galathea*

Most of the transect count was from Hutchinson's Bank Nature Reserve, and then from the Brent Reservoir and Featherbed Lane Roadside Verge. The marbled white was also recorded from Horsenden Hill West, Mitcham Common Route B and a singleton at Railway Fields. Elsewhere in London there was a record from Trent Park. Total count on transects: 318.

### GATEKEEPER *Pyronia tithonus*

Recorded on all of the transects including the more urban sites. The index however was the lowest since 2003. Total count on transects: 2,315.

### MEADOW BROWN *Maniola jurtina*

Recorded on all transects, though the index was just over a half of that of 2006. The counts at Fryent Country Park and at Beane Hill were the lowest since transect monitoring commenced at those linked sites in 1986 and 1988, where site-specific factors included the absence of hay harvesting for several years, and the growth of woodland at Beane Hill. Total count on transects: 4,227.

RINGLET *Aphantopus hyperantus*

The index was relatively low as compared with the years back to 1996. The transect at Featherbed Lane Roadside Verge accounted for over half of the count, and other sites with ringlets were Hutchinson's Bank Nature Reserve, the two Mitcham Common transects and a singleton at South Norwood Country Park. Elsewhere in London there were records from Chapel Bank, Cannon Hill Common, Horsenden Hill, Trent Park and at Park Farm, Enfield. Total count on transects: 371.

SMALL HEATH *Coenonympha pamphilus*

Most of the transect counts were from Hutchinson's Bank Nature reserve with the remainder from the London Wetland Centre, Featherbed Lane Roadside Verge and Tower Hamlets Cemetery Park. Elsewhere in London records were received from Chapel Bank, Hackney Marshes, Richmond Park, Trent Park and Wormwood Scrubs. Total count on transects: 93.

Escaped and other species recorded within London included:

*Idea leuconoe* was reported by Neil Anderson at Kew Gardens on 15 July 2007.

*Kallima* sp. An 'oakleaf' butterfly of the genus *Kallima* was encountered on a garden hedge near to the Zoological Society of London on the edge of Regent's Park on 31 August 2007 by Torben Larsen, David Lees, other entomologists, and by local pedestrians. Shortly afterwards an attendant arrived from the nearby Butterfly House in the Zoo to collect the escapee.

Species recorded beyond Greater London but within the wider LNHS recording area:

SILVER-STUDDED BLUE *Plebeius argus*. Recorded at a site at Fairmile Common in June 2007 by Stephen Spooner.

For detailed records of species within the wider LNHS area, reference should be made to the respective county reports produced by Butterfly Conservation and others.

## Discussion

The London transects contribute towards the national indices of the UK Butterfly Monitoring Scheme, and for species and results for the most recent year available, 2006, refer to Greatorex-Davis et al. (2007). For information on the distribution of butterflies within the London Area refer to Plant (1987) and Fox and Williams (2006).

## Acknowledgements

In 2007 the transect walkers included the Corporation of London team at Hampstead Heath, Michael Berthoud, Simon Mercer and Leslie Williams at Fryent Country Park and Beane Hill, Ann Rix at Gutteridge Wood, Martin Boyle at Mitcham Common, R. J. Bullock at WWT Wetland Centre at Barn Elms, David Bevan and Rebecca Turpin at Railway Fields, Martin Wills and others at Hutchinson's Bank Nature Reserve and Chapel Bank, Malcolm Bridge at South Norwood Country Park, Terry Lyle at Tower Hamlets Cemetery Park, Andy Brown at Gunnersbury Triangle, Andrew Self and Roy Beddard at the Brent Reservoir, Donald Rooum at Regent's Canal towpath, Mike Taylor at Kenwood, Joan Lowe at Featherbed Lane Roadside Verge, and David Howdon and Andy Culshaw at the Horsenden Hill transects and at Perivale Wood. Records were also received from the transect walkers listed above and from Neil Anderson, Diane Andrews, Sarah Barnes, Robert M. Callf, Miss D. G. Carr, Dave Chandler, Vic Fisher, Tim Freed, Martin Honey, Ron Kettle, Torben B. Larsen, David Lees, Mick Massie, Nick Murphy, Colin Plant, Mrs Anne Rose, Paul Sellers, Martin Smith, Bob Snellgrove, Stephen Spooner, and from London Natural History Society field meetings / LNHS *Newsletter*, and the Butterfly Conservation Hertfordshire and Middlesex Branch *Newsletter*. The support of the landowners and land managers of the transect and other sites are acknowledged, including a significant number of the London boroughs (see the Methods), the Corporation of London, other public authorities, the London Wildlife Trust, the Mitcham Common Conservators, the Friends of Tower Hamlets Cemetery Park, Barn Hill Conservation Group and the Welsh Harp Conservation Group. The co-operation with the county co-ordinators for Butterfly Conservation is noted particularly from Andrew Wood and John Murray for Hertfordshire and Middlesex. Dr Dave Dawson had previously advised on the statistical method for the collations and the programming of the spreadsheets. Simon Mercer helped develop the series of linked spreadsheets. I also thank Colin Plant and Caroline Williams.

## References

ASHER, J., WARREN, M., FOX, R., HARDING, P., JEFFCOATE, G. and JEFFCOATE, S. 2001. *The millennium atlas of butterflies in Britain and Ireland*. Oxford University Press.

CRAWFORD, T. J. 1991. The calculation of index numbers from wildlife monitoring data. *In* Goldsmith, B. (ed.), *Monitoring for conservation and ecology*: 225–248. Chapman and Hall. London.

FOX, R. and WILLIAMS, L. 2006. A commentary on recent changes to butterfly distributions in the London Area. *Entomologist's Rec. J. Var.* **118**: 69–84.

GREATOREX-DAVIES, J. N., BRERETON, T. B., ROY, D. B., MIDDLEBROOK, I. and CRUICKSHANKS, K. L. 2007. *United Kingdom Butterfly Monitoring Scheme Report for 2006*. CEH, Monks Wood, Huntingdon.

PLANT, C. W. 1987. *The butterflies of the London Area*. London Natural History Society.

POLLARD, E. and YATES, T. J. 1993. *Monitoring butterflies for ecology and conservation*. Chapman & Hall, London.

ROY, D. B. and ROTHERY, P. 2002. Comparison of the BMS (chaining) and TRIM (log-linear) methods for the calculation of collated indices. *In* Greatorex-Davies, J. N. and Roy, D. B. *The butterfly monitoring scheme. Report to recorders 2001*. Centre for Ecology & Hydrology. Natural Environment Research Council.

WILLIAMS, L. R. 2000. London butterfly monitoring report for 1999. *Lond. Nat.* **79**: 87–102.

WOOD, A. and MURRAY, J. B. 2007. *Hertfordshire and Middlesex butterfly and moth report 2006*. Hertfordshire and Middlesex Branch of Butterfly Conservation.

# Further notes on the fauna of Shooters Hill, including Oxleas Wood SSSI and Woolwich Common, south-east London

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**Dedicated to the memory of W. G. ('Bunny') Teagle, 1920–2008**

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## Summary

An updated supplement to an earlier paper (Burton 1992) is presented here. Since that date the threat to Oxleas Wood and adjacent parts of Shooters Hill posed by the construction of the East London River Crossing which was under consideration at the time was, fortunately, abandoned following a Public Enquiry. The threat did at least induce London naturalists and ecologists to pay more attention to the fauna and flora of the area.

In this paper I have limited my attention to the mammals, birds and Macrolepidoptera (butterflies and moths). A single species of mammal has been added to the Shooters Hill list and 28 more species and one subspecies of birds to those recorded since 1943, making a total of 104 species of which 57 species have been known to have bred at least once. As regards the Macrolepidoptera, a further three species of butterflies to the 32 previously recorded and 37 species of moths have been added to the all-time list of the latter, bringing the total number of the 'larger' moth species recorded since 1773 to 315. Of these, 131 species (41.6 per cent) are characteristic of woodland.

## Introduction

Since my earlier paper in this journal on the fauna and flora of Shooters Hill (Burton 1992), I have been looking out for additional records. In particular, I have since had access to the journals kept in the years 1946 to 1951 by my friend, the late Dr Denis F. Owen, through the kindness of his widow, Mrs Clare Owen. These contain many notes on the Lepidoptera of Shooters Hill.

At the time of publication of the 1992 paper this area, and especially Oxleas Wood, was under threat from the proposed construction of the East London River Crossing. Fortunately, following strong protests and a Public Enquiry, the Inspector ruled against it and the project was abandoned. In support of the protests, I wrote letters and sent copies of my paper to, among others, the then EEC Commissioner for the Environment, De Heer Karel van Miert, and Mr Ken Livingstone, the then Leader of the Greater London Council. Both sent favourable replies, Mr van Miert assuring me that the EEC would take up the matter with the UK government, particularly as a proper environmental impact study had not apparently been made.

In Burton (1992), some references were made to Woolwich Common, which lies at the north-western foot of Shooters Hill. Although not strictly part of Shooters Hill, it is close enough for the two areas to be considered together and I have therefore done this. In fact, most recent ornithological observations refer to the Common.

## Mammals

**Greater horseshoe bat** *Rhinolophus ferrum-equinum*: inexplicably, I overlooked the report in Rigden (1955) of one of these bats being found in Oxleas Wood in November 1953. A previously unrecorded species for the area.

**Grey squirrel** *Sciurus carolinensis*: regrettably, I also overlooked the reports by Teagle (1963, 1964) that also recorded the occurrence of this squirrel in 1960 and 1961 in the woods of Shooters Hill, including Castlewood, Eltham Common, Falconwood, Jackwood, Oxleas Wood and Shepherdleas Wood.

## Birds

The nomenclature adopted here follows that used in the Checklist of Birds of the London Area published in the latest *London Bird Report*, that for 2004, No. 69. I have extracted records from the *London Bird Reports* published since my 1992 paper and also from the LNHS *Ornithological Bulletins* published up to March 2008. Unless otherwise stated, records attributed to Des McKenzie (DM, and in press) and John Reid (JR) were personally communicated in 2008.

**Canada goose** *Branta canadensis*: JR reports that in recent years this species occasionally flies over Shooters Hill in small numbers. Not previously reported from the area.

**Mallard** *Anas platyrhynchos*: like the Canada goose, JR occasionally sees mallard fly over in small numbers. Not previously reported from the area.

**Grey partridge** *Perdix perdix*: I should have mentioned in my 1992 paper that I flushed a pair of this species on Woolwich Common on 26 May 1947 and searched unsuccessfully for a nest or chicks.

**Quail** *Coturnix coturnix:* one reported by John Tilbrook (*LBR* for 1997; DM) calling from long grass at the southern end of Woolwich Common on 22 May 1997. An hitherto unreported species for the area.

**Gannet** *Morus bassanus*: one seen to fly eastwards over Oxleas Wood on 13 June 2004 (*Orn. Bull.* No. 274). An hitherto unreported species in the area.

**Cormorant** *Phalacrocorax carbo*: JR reports that in recent years he regularly sees cormorants flying over Shooters Hill in ones and twos, but exceptionally, on 14 September 2008, he saw twenty fly over to the west. Not previously reported from the area.

**Grey heron** *Ardea cinerea*: one seen by DM on 13 March 1995 apparently hunting small mammals in the central area of Woolwich Common. JR reports that in recent years he has seen the occasional bird flying over Shooters Hill. An hitherto unreported species in the area.

**Honey buzzard**: *Pernis apivorus*: one dark juvenile which flew south-westwards at 12.05 over Eltham Park/Oxleas Wood on 23 September 2000 was part of a large influx of this species into the UK that autumn (Self 2004); a bird seen flying westwards over Oxleas Wood on 11 September 2005 was considered by the observer to have been this species (*Orn. Bull.* No. 282). These appear to constitute the first records of this species for the area.

**Red kite** *Milvus milvus*: as a consequence of the recent reintroduction projects in England, this large raptor is now appearing more and more frequently in the London Area. Sightings so far reported over Shooters Hill (all over Oxleas Wood) are as follows: one flew north on 30 April 2005 (*Orn. Bull.* No. 279); one flew west on 17 May 2006 *(Orn. Bull.* No. 286); one flew west on 28 March 2007 (*Orn. Bull.* No. 291) and another in the same direction on 17 May 2007 *(Orn. Bull.* No. 292). A previously unrecorded species in the area.

**Sparrowhawk** *Accipiter nisus*: as in the 1940s and 1950s, this raptor is believed by JR to breed most years in the Shooters Hill woods as he often sees them in spring and summer. DM reports that he saw this raptor irregularly each year on Woolwich Common but does not believe that it has bred here.

**Common buzzard** *Buteo buteo*: the expansion of the breeding range of this raptor into southern England in recent years has led to passage birds being seen with greater regularity in the London Area, including the Kentish sector, and since 1999 pairs have been breeding or attempting to do so in north-west Kent (Oliver 2007). Sightings so far reported at Shooters Hill (all at Oxleas Wood) are: one on 10 June 2000 (*LBR* for 2000); single birds on 17 and 29 April 2005 (*Orn. Bull.* No. 279); one on 2 April and another flying south on 16 April 2006 (*Orn. Bull.* No. 285); one on 3 May 2006 and another flying south-west on 11 September that year (*Orn. Bull.* Nos. 286 and 288); single birds on 15 March, 4 and 8 April 2007 (*Orn. Bull.* No. 291); one flying north-east on 3 April 2008 (*Orn. Bull.* No. 297). An hitherto unreported species in this locality, it seems likely that the common buzzard will soon be attempting to breed at Shooters Hill, if it is not already doing so.

**Kestrel** *Falco tinnunculus*: as in the 1940s, the kestrel is believed by JR to breed in most years on Shooters Hill, as does DM at Woolwich Common and who comments that the latter area is one of the best places in the district to see this raptor with one or two birds present on most visits. I should have mentioned in my 1992 paper that I watched a pair of kestrels circling over this Common on 10 May 1946 and assumed that they were nesting somewhere in the vicinity.

**Hobby** *F. subbuteo*: it is pleasing to note that since one or two pairs were recorded nesting in the Oxleas Wood/Jackwood/Shooters Hill area in 1946 and 1947 (Burton 1992), hobbies have been present there every spring since a pair bred in Jackwood in 1999 and 2000 (JR). He further informs me that he has seen adult hobbies chasing a green woodpecker from a field and 'puffing' themselves up to see off a group of magpies which were too close to their nest.

**Peregrine falcon** *F. peregrinus*: so far this falcon has been seen at Oxleas Wood on 25 September 1998 (*LBR* for 1999); in June 2004 (*LBR* for 2004), 11 June 2005 (*Orn. Bull.* No. 280), 4 June 2006 (*Orn. Bull.* No. 286) and 2 May 2008, flying north (*Orn. Bull.* No. 298). A previously unrecorded species in the area.

**Moorhen** *Gallinula chloropus*: a pair bred in 1998 at Woodlands Farm (*LBR* for 1998). A species previously unrecorded in the area

**Northern lapwing** *Vanellus vanellus*: JR reports that occasional small flocks still occur at Shooters Hill, mainly in winter.

**Woodcock** *Scolopax rusticola*: one flushed from a garden by Oxleas Wood on 21 November 2007 (*Orn. Bull.* No. 295).

**Black-headed gull** *Larus ridibundus*: as in the 1940s and 1950s, flocks regularly seen flying over the area, presumably to and from the Thames (DM, JR).

**Ring-billed gull** *L. delawarensis*: a vagrant from North America, the adult which has frequented the vicinity of the Thames in the Borough of Greenwich since it was first noticed at Charlton in 1996 was noted visiting Woolwich Common on 11 October 2000 (*LBR* for 2000), 2 and 30 January and 1 February 2004 (*Orn. Bull.* No. 272), 7 December 2004 (*Orn. Bull.* No. 275) and 'intermitttently' throughout 2005 (*Orn. Bull.* No. 281). A previously unrecorded species.

**Common gull** *L. canus*: as per the black-headed gull, but usually in smaller numbers.

**Lesser black-backed gull** *L. fuscus*: irregularly seen flying over Woolwich Common, presumably on the way to or from the Thames (DM). JR reports that occasionally he sees small numbers flying over Shooters Hill.

**Herring gull** *L. argentatus*: as per the last species, but seen more frequently (DM, JR).

**Great black-backed gull** *L. marinus*: JR reports occasionally seeing this gull flying over Shooters Hill in ones and twos. Not previously recorded from the area.

**Feral rock dove** *Columba livia*: as in the 1940s and 1950s, a regular sight flying over Shooters Hill in small parties (JR). At Woolwich Common, DM reports that a 'handful of birds could usually be found foraging at the northern end' of the Common. He also regularly saw them passing overhead; his best count being thirty flying north on 17 May 1997.

**Stock dove** *C. oenas*: JR reports that pairs are still present in summer on Shooters Hill and he has watched their display flights and seen them searching for nest holes, so they are presumably still breeding there.

**Woodpigeon** *C. palumbus*: as in the 1940s, 1950s and 1980s, a common breeding bird on Shooters Hill. DM reports that small numbers breed on Woolwich Common and flocks are often seen flying over, especially in the autumn. His highest counts have been *c.*300 on 17 October 1996 (declining to *c.*200 by 26 October) and *c.*150 flying west on 30 October 1997.

**Collared dove** *Streptopelia decaocto*: JR reports that he occasionally sees single birds on Shooters Hill.

**Turtle dove** *S. turtur*: during his study-period from 1993 to 2003, DM saw two birds on Woolwich Common: one flew in from the west on 1 September 1996 and another flew low to the north on 13 May 1997. A previously unrecorded species in the area.

**Ring-necked parakeet** *Psittacula krameri*: JR reports that this alien species has spread to Shooters Hill in recent years and he now sees birds on most days, including flocks of around thirty, and has watched them exploring possible nesting holes. A new species for the area.

**Cuckoo** *Cuculus canorus*: apparently scarcer than in the 1940s and 1950s. One seen in Oxleas Wood on 15 May 2004 (*Orn. Bull.* No. 274) and another heard calling there on 3 June 2006 (*Orn. Bull.* No. 286).

**Barn owl** *Tyto alba*: DM reports that in 1995 a bird was present on Woolwich Common from 12 March to 19 April. It maintained regular hunting times exclusively over the southern end of the Common. During its stay twenty-two pellets were collected, which on examination at the Horniman Museum by David Lloyd were found to contain mostly the remains of the field vole *Microtus agrestis*. Its roost was located in the disused west wing of the old military academy in Academy Road. This species was last reported in the area in the 1900s (Burton 1992).

**Little owl** *Athene noctua*: within the past decade JR has heard birds calling on two or three occasions.

**Tawny owl** *Strix aluco*: apparently still breeds in the woods of Shooters Hill in most years. JR reports that he hears birds calling regularly and that a neighbour saw a juvenile in 2007. At Woolwich Common, DM saw one fly at dusk across Academy Road and into the south-east corner of the Common on 26 August 1995, his only record during the period 1993–2003.

**Short-eared owl** *Asio flammeus*: one seen by JR at Oxleas Wood on 18 October 1999 (*LBR* for 1999). A previously unrecorded species in the area.

**European nightjar** *Caprimulgus europaeus*: DM saw a bird fly low over the northern end of Woolwich Common and into vegetation there on 3 September 1997, the first record since this species was reported to be a summer resident on Shooters Hill in the 1850s (Burton 1992).

**Common swift** *Apus apus*: as in the 1940s and 1950s, regularly seen in small parties feeding over Shooters Hill and Woolwich Common during passage and the breeding season (DM, JR). DM's highest count was *c.*50 on 4 July 1997; he believes the species breeds in nearby Charlton where it certainly did so in the 1940s and 1950s.

**Green woodpecker** *Picus viridis*: pairs continue to breed in the woods on Shooters Hill (JR). At Woolwich Common, having noted birds in April, September and October in 1996, March, April and June in 1997, DM was able to report the successful breeding of a pair in 1999.

**Great spotted woodpecker** *Dendrocopos major*: several pairs continue to breed in the woods on Shooters Hill (JR). At Woolwich Common DM saw this woodpecker on most of his visits but was not able to confirm breeding until a pair nested in 1999.

**Lesser spotted woodpecker** *D. minor*: JR reports that he occasionally sees single birds every three or four years in the Shooters Hill woods. On 1 September 1996, DM encountered one in the grounds of Queen Elizabeth Military Hospital.

**Skylark** *Alauda arvensis*: following my report (Burton 1992) of several pairs of skylarks nesting on Woolwich Common, DM informs me that he located one occupied territory annually from 1993 to 1995, then two in 1996, from which one brood was successfully reared, and a single territory again in 1999. From then, until his study of the area ceased in 2003, there were none. At Shooters Hill, JR states that he occasionally sees small numbers flying over, but not every year.

**Sand martin** *Riparia riparia*: at Woolwich Common DM saw eleven fly south-east on 13 September 1995 and 25–30 fly west at about 18.00 hrs on 16 September 1996, his only records and the first for the area. A previously unreported species in the area.

**Swallow** *Hirundo rustica*: DM observed a regular spring and autumn passage annually over Woolwich Common during the years 1993–2003, and JR reports he observes the same over Shooters Hill in small numbers. Breeding has not been reported on the Hill since 1949 (Burton 1992).

**House martin** *Delichon urbicum*: as per the last species, but also often seen over Woolwich Common during the breeding season as pairs bred in the neighbourhood (DM). In a recent year JR saw hundreds gathered over Shooters Hill during autumn passage.

**Tree pipit** *Anthus trivialis*: at Woolwich Common DM recorded the following sightings: one on 18 May 1994; one on 6 May 1995; two on 24 and 25 April, singletons on 30 April, 6 and 9 May, two on 31 August and one flying south on 23 September 1996; three on 30 April 1997 with one staying until the next day.

**Meadow pipit** *A. pratensis*: an annual resident in the breeding season on Woolwich Common: five pairs reported in 1993; five or six singing males or breeding pairs in 1994; seven in 1995; eight in 1996; five or six in 1997; about six or seven in 1998, 1999 and 2000; and seven or eight in 2001. Now also known to breed at Woodlands Farm on the north-eastern slopes of Shooters Hill: two to four pairs in 1998 (DM; *LBR*s). JR states that he occasionally sees small numbers flying over the Hill on passage. DM also reported this pipit regularly on spring and autumn passage at Woolwich Common, in numbers as high as forty or so on occasions.

**Yellow wagtail** *Motacilla flava flavissima*: DM has only two records of this species on Woolwich Common, where it used to breed in the 1940s: two flying south on 18 September 1995 and two flying north on 4 September 1996.

**Grey wagtail** *M. cinerea*: JR occasionally sees single birds flying over Shooters Hill each year and DM observed this wagtail on Woolwich Common on three occasions: one flying west on 1 March 1994 and on 13 August 1996, and one flying north on 2 December 1997.

**White wagtail** *M. alba alba*: one seen by DM feeding with meadow pipits at the northern end of Woolwich Common on 4 April 1996 (*LBR*), the first report of this race from the Shooters Hill area.

**Pied wagtail** *M. a. yarrellii*: in my 1992 paper I overlooked mentioning my sighting of a pair on Woolwich Common on 19 October 1947. In the period 1993–2003, DM often observed one or two birds on passage there. On Shooters Hill, JR occasionally sees single birds flying over.

**Wren** *Troglodytes troglodytes*: eight breeding territories counted by DM on Woolwich Common in both 1996 and 1998 (*LBRs*). JR reports that wrens still breed in good numbers on Shooters Hill.

**Dunnock** *Prunella modularis*: three territories counted by DM on Woolwich Common from 1993 to 1995, five in 1996, five or six in 1997 and two in 1998 (*LBR*s). On Shooters Hill, JR reports that dunnocks still breed in good numbers.

**Robin** *Erithacus rubecula*: six or seven territories reported on Woolwich Common by DM in 1994 and 1995, three in 1996 and 1997, and two in 1998 and 1999. At Woodlands Farm on the north-eastern side of Shooters Hill there were at least ten territories in 1998 (*LBR*). On Shooters Hill proper, JR reports that robins still breed in good numbers.

**Black redstart** *Phoenicurus ochruros*: a female on Woolwich Common on 25 March 1993 (*LBR*) was the first reported for the Shooters Hill area.

**Common redstart** *P. phoenicurus*: Woolwich Common: a male from 17–20 April 1996; a female on 12 September was joined by a young male on 13 September 1996; a female or immature male on 28 September 1997; a male on 16 April 2001 and a single bird on 28 August 2002 (DM; *LBR*s).

**Whinchat** *Saxicola rubetra*: during the period 1993 to 2003 DM saw this species on Woolwich Common on the following occasions: 1995: three between 7 and 9 September, falling to two on 10 and 11 September, two between 19 and 22 September, and two between 1 and 8 October;1996: two on 19 May, 16 and 17 August; three on 28 August and 31 August reducing to two on 1 September; then three from 2 to 4 September; two on 24 September and three on 27 September; 1997: one on 23 April; three from 16 to 18 August; two from 19 to 26 August; four on 2 September; five on 4 September; three on 8 September; two on 24 and 26 September; three on 28 September; 1998: two on 26 September (DM; *LBR*).

**European stonechat** *S. torquata*: singles seen on Woolwich Common as follows: 30 March, 16 and 17 August and 1 October 1996; one on 24 September 1997; three on 7 November 1998 (DM; *LBR*s). First records for the area.

**Northern wheatear** *Oenanthe oenanthe*: reported by DM to be a regular double-passage migrant on Woolwich Common throughout his period of study from 1993–2003, the highest count being seven between 16 and 18 April 1996. A first-year male on 10 May 1997 he considered to belong to the Greenland race. As reported in Burton (1992), a pair was seen with three young on the Common in June 1947.

**Ring ouzel** *Turdus torquatus*: two males present on Woolwich Common on 24 and 25 March 1996, one of them remaining until 27 March ( DM, *LBR*). From 2 to 12 October 2001 a male was seen in Oxleas Wood by JR. First records for the area.

**Blackbird** *T. merula*: DM reports that breeding territories on Woolwich Common never exceeded three during his period of study from 1993 to 2003. His highest count was twenty birds on 11 October 1996. On Shooters Hill, blackbirds still breed in good numbers (JR).

**Fieldfare** *T. pilaris*: first autumn arrival of the year in 1996 was seen on 4 September (*LBR*). In that year DM counted fifty-two birds present on Woolwich Common on 22 February 1996, his highest count. The species was usually seen in very small numbers on the Common in most winters, as also on Shooters Hill, where JR reports that they normally appear in flocks of up to ten birds.

**Song thrush** *T. philomelos*: one territory located by DM on Woolwich Common in 1996, two in 1998 and one in 1999. On 7 May 2000, fifteen found singing were thought to be on migration. In 1998 at least six territories were located on Woodlands Farm (*LBR*s). According to JR, the species continues to breed in good numbers on the Hill.

**Redwing** *T. iliacus*: a flock of about 200 was seen by DM on Woolwich Common on 26 November 1997 (*LBR*). His previous highest flock was one of about forty-five on 4 January 1994. In 1996 he counted seventy-four flying north or north-west over the Common at 11.30 hrs on 8 January. JR also reports them in winter on Shooters Hill, sometimes in flocks of up to about forty.

**Mistle thrush** *T. viscivorus*: a flock of sixteen was seen by DM on Woolwich Common on 7 September 1996. In the years 1993–1998 inclusive he located a single breeding territory on the Common. On the north-eastern slopes of Shooters Hill four territories were located in 1998 at Woodlands Farm (*LBRs*). JR reports that he sees pairs throughout the year on Shooters Hill and believes that they continue to breed there.

**Grasshopper warbler** *Locustella naevia*: one located by J. Tilbrook on Woolwich Common from 9 to 11 May 2001 *(LBR),* the first reported in the area since the mid nineteenth century (Burton 1992).

**Sedge warbler** *Acrocephalus schoenobaenus*: recorded by DM on three occasions on Woolwich Common: a juvenile between 25 August and 2 September 1996 was succeeded by another bird on 13 September; on 3 May 1997 a single bird was present. These were the first records of this species in the Shooters Hill area.

**Reed warbler** *A. scirpaceus*: like the last species, also seen by DM on three occasions at Woolwich Common, the first for the Shooters Hill area: one singing on 30 April 1994; one on 19 and 20 August 1996; one on 3 September 1998.

**Blackcap** *Sylvia atricapilla*: in the period 1994 to 1999, DM located one to two territories on Woolwich Common. JR reports that nowadays blackcaps breed in good numbers on Shooters Hill, where, on 1 December 2005, an overwintering male was seen in Oxleas Wood (*Orn. Bull.* No. 283).

**Garden warbler** *S. borin*: recorded by DM on Woolwich Common as follows: 1996: one on 6 and 7 May; three on 17 August; one on 27 August and 8 September; 1997: two on 30 April and one on 13 May; 1999: one singing on 2 May.

**Lesser whitethroat** *S. curruca*: one present on Woolwich Common on 17 April 1996 (*LBR*). During his period of study, DM located an average of two territories each year, but breeding was not always successfully accomplished.

**Common whitethroat** *S. communis*: DM located five territories in 1994 and 1995, and seven in each of the years from 1996 to 1998 inclusive on Woolwich Common. The *LBR* for 1999 reported ten territories located on the Common in 1999. JR tells me that the species breeds in good numbers in the Woodlands Farm area of Shooters Hill.

**Wood warbler** *Phylloscopus sibilatrix*: one male singing in Oxleas Wood on 9 May 1993 and another singing there on 15 May 1999 (*LBR*s); one seen by DM in an oak near the underground reservoir on Woolwich Common at 07.15 hrs on 19 August 1996 (*LBR*s).

**Common chiffchaff** *P. collybita*: DM located three territories on Woolwich Common in the years 1995–1997 inclusive, one in 1999 and four in 2000 (*LBR*s). His biggest count was of ten birds present on the Common on 24 September 1997. On Shooters Hill, JR reports that it continues to breed in good numbers.

**Willow warbler** *P. trochilus*: Woolwich Common: DM reports four pairs bred in 1997, two territories located in 1999 and three in 2000 (*LBR*s).

**Goldcrest** *Regulus regulus*: during his study period from 1993 to 2003, DM recorded goldcrests irregularly at Woolwich Common, mainly in the autumn. His largest count was of six on 15 October 1998. At Oxleas Wood several were seen by JR with mixed titmice flocks on 21 October 2006 (*LNHS Newsletter* No. 199), who informs me that it is to be seen in good numbers in autumn and winter in the Shooters Hill woods, where it may breed.

**Firecrest** *R. ignicapillus*: one in Oxleas Wood on 22 October 2002 (*LBR*). Not previously recorded from the area.

**Spotted flycatcher** *Muscicapa striata*: during his study of the birds of Woolwich Common, DM recorded a pair nesting and successfully fledging three young in 1995. Thereafter his only other records were of singles on 24 September 1996, 2 September 1997 and 29 August 1999. In 2000 one probable breeding pair was located in Oxleas Wood (*LBR*).

**Pied flycatcher** *Ficedula hypoleuca*: Woolwich Common: one on 8 August 1995, two near the underground reservoir on 17 August 1996 and one on 2 September 1997 (DM, *LBR*).

**Long-tailed tit** *Aegithalos caudatus*: six pairs present at Woodlands Farm on the north-eastern slopes of Shooters Hill in the 1998 breeding season (*LBR*). JR reports that nowadays the species breeds in good numbers in the woods on Shooters Hill and that at Oxleas Wood on 21 October 2006, several mixed flocks of titmice included long-tailed tits (*LNHS Newsletter* No. 199). On Woolwich Common, DM located two to four breeding territories in most years from 1993 to 2003. On 23 May 1996 he found that five newly fledged young had perished in overnight rainfall on the Common.

**Blue tit** *Cyanistes caeruleus*: DM located seven or eight breeding territories annually on Woolwich Common in the period 1993–2003. JR informs me that it is still a common breeding bird on Shooters Hill. In Oxleas Wood about twenty-five were seen on 14 February 2001 (*LBR*) and several mixed flocks of titmice were present in the same wood on 21 October 2006 which included this species (JR in *LNHS Newsletter* No. 199).

**Great tit** *Parus major*: DM located at least three breeding territories annually on Woolwich Common in the period 1993–2003. JR reports that the great tit continues to breed in good numbers on Shooters Hill, where, on 21 October 2006, he encountered several mixed flocks of titmice in Oxleas Wood which contained this species (*LNHS Newsletter* No. 199).

**Coal tit** *Periparus ater*: DM's only record of this species on Woolwich Common in the years 1993–2003 was of one on 22 August 1996. JR reports that he sees coal tits in ones and twos each year in the woods on Shooters Hill, including Oxleas Wood.

**Marsh tit** *Poecile palustris*: one heard calling several times in Oxleas Wood in February and March 1998 (*LBR*).

**Nuthatch** *Sitta europaea*: Oxleas Wood: at least one pair was present in the 2000 breeding season and three were seen on 14 February 2001 (*LBR*s). JR reports that this species still breeds in the Shooters Hill woods.

**Treecreeper** *Certhia familiaris*: JR reports that this species continues to breed in the Shooters Hill woods.

**Jay** *Garrulus glandarius*: DM regularly saw jays on Woolwich Common in the years 1993–2003, but nearly always single birds or pairs, and he was never able to confirm breeding. However, on 24 September 1996 he counted thirteen there, the same date as four flew high over to the south; all possible migrants. On Shooters Hill itself, JR reports that at least one or two pairs continue to breed.

**Magpie** *Pica pica*: two to three pairs bred on Woolwich Common in 1997 and three pairs in 1998 (DM; *LBR*). On Shooters Hill proper, several pairs breed nowadays (JR).

**Jackdaw** *Corvus monedula*: DM considered this species to be a passage migrant at Woolwich Common and had only three records during his study from 1993 to 2003: 1996: one flying west at 06.45 hrs on 28 March; two flying north-west at 07.15 hrs on 22 September; 1997: three flying east on 26 September. I should have included in my 1992 paper mention of a pair I saw on this Common on 10 May 1946. On Shooters Hill, JR informs me that these days he only occasionally sees jackdaws flying over, usually in ones and twos.

**Rook** *C. frugilegus*: not seen by DM during his study of the birds of Woolwich Common from 1993 to 2003, but on 19 October 1947 I watched twelve feeding there. Not reported from Shooters Hill by JR.

**Carrion crow** *C. corone*: 220 reported at a pre-roost in Oxleas Wood on 10 February 1997 (*LBR*). Nowadays, JR reports that several pairs breed on Shooters Hill and that flocks of a hundred or so are occasionally observed on and around Oxleas Meadow. At Woolwich Common, DM recorded a single pair breeding in the years 1993 to 1996, two or three pairs in 1997, and one or two pairs in the years 1998 and 1999. His highest count was of fifty-five on 26 March 1997.

**Starling** *Sturnus vulgaris*: DM recorded starlings in small numbers (generally under fifty) on Woolwich Common in the years 1993 to 2003, and informs me that about five or six pairs breed annually on the periphery of the Common. JR reports that pairs breed on Shooters Hill and that he has noted winter flocks of several dozen birds.

**House sparrow** *Passer domesticus*: DM occasionally saw or heard these sparrows on the east side of Woolwich Common and thought that they bred in a nearby housing estate. JR states that a few pairs still breed on Shooters Hill itself.

**Chaffinch** *Fringilla coelebs*: at Woolwich Common DM reports that the only territory established in his study period was in 1997. However, he made the following counts of passage birds: fifteen flying north-west on 17 October 1996, fifteen on 29 January 1997 and ten on 7 March 1997. On Shooters Hill, JR reports that birds are present in the summer and therefore breeding probably occurs.

**Brambling** *F. montifringilla*: DM saw two flying north at Woolwich Common on 11 October 1996 (DM; *LBR*).

**Greenfinch** *Carduelis chloris*: eleven territories located on Woodlands Farm, Shooters Hill, in the 1998 breeding season *(LBR)*. Elsewhere on Shooters Hill, JR considers them also to breed. DM reported that one pair bred on Woolwich Common in 1998 and two territories were located there in 1999, but that the number of annual breeding territories never exceeded three in the period 1993–2003 (DM; *LBR*s).

**Goldfinch** *C. carduelis*: during the years 1993–2003, DM was never able to prove breeding of this finch on Woolwich Common. However, according to the *LBR* for that year, a pair bred in 1997. His highest counts there were flocks of *c.*20 on 19 December 1993, *c.*17+ on 2 January 1994 and *c.*30 on 31 August 1996. I should have mentioned in my 1992 paper that I saw several goldfinches on Woolwich Common on 10 May 1946 and one on 26 May 1947. As they are present in the summer on Shooters Hill, JR thinks it likely that they still breed there nowadays.

**Siskin** *C. spinus*: DM recorded this finch on three occasions on Woolwich Common, all in 1997: three on 8 September, one on 29 October and two on 26 November. These constitute the first records for the Shooters Hill area. On Shooters Hill itself, JR states that in recent years it has been an occasional visitor in small numbers.

**Linnet** *C. cannabina*: DM reports that an average of two breeding pairs were present on Woolwich Common in the years 1993–2003. In 1997 three or four pairs bred there. On Shooters Hill, JR only sees birds occasionally flying over.

**Lesser redpoll** *C. cabaret*: DM saw a flock of twelve in birch trees on Woolwich Common on 12 January 1998, his only record during the period 1993-2003.

**Bullfinch** *Pyrrhula pyrrhula*: up to twelve birds were present on Woodlands Farm, Shooters Hill, all autumn in 1997 and also in January 1998 (*LBR*s). JR considers the bullfinch to be only an occasional winter visitor now. On Woolwich Common one breeding territory was usually located by DM annually in the years 1993–2003.

**Reed bunting** *Emberiza schoeniclus*: during his study of the birds of Woolwich Common, DM saw this species on the following dates: three flying south on 1 September 1996; one on 11 October 1996; one on 7 March 1997; one flying south on 28 September 1997. These constitute the first records for the area.

ALIEN SPECIES

**Red-faced lovebird** *Agapornis pullaria*: a party of six of this central-African species, obviously escaped from captivity, was seen by JR in Oxleas Wood on 28 August 2004 (LNHS *Orn. Bull.* No. 275).

### Comments

Excluding the alien red-faced lovebird, the number of bird species and subspecies recorded in the Shooters Hill area since the period 1943 to 1958 has been increased by the above reports by twenty-nine to a total of 104 and the number known to have bred at least once since 1943, or thought to have done so, by seven to fifty-seven species. This is largely due to the inclusion in this supplement of Woolwich Common. The typical subspecies of the pied wagtail, the white wagtail, was recorded for the first time. Among the species that once bred but now appear to have ceased to do so since 1950–1958 are the grey partridge, little owl, skylark (since 1999), tree pipit, yellow wagtail and yellowhammer. At the present time, the number of species thought still to be breeding in the area, at least occasionally, is forty-one. The total species list since the mid nineteenth century now stands at 110. The collared dove arrived in the area after 1958. At Woolwich Common since 1943, eighty species have been recorded, of which thirty-one are known or thought to have bred at least occasionally.

## Macrolepidoptera

The many records from the late Dr D. F. Owen (DFO) were received in personal communications or extracted from his journals. I am also indebted for many other records to the *magnum opus* on Kent Lepidoptera by the late J. M. Chalmers-Hunt (1960–1981) and reference to these is simply cited as C-H in most cases. Unless otherwise stated, the following records refer to imagines. I have followed the nomenclatures used by Plant (1987 and 1993).

### BUTTERFLIES

**Essex skipper** *Thymelicus lineola*: further to the note that Allen (1991, 1992) found this butterfly to be the commonest species on Woolwich Common, I should have added that he first discovered it there in 1978.

**Swallowtail** *Papilio machaon*: I should perhaps have mentioned in Burton (1992) that the dead imago of the Continental subspecies *bigenerata* I found on Shooters Hill on 6 June 1946 and which was communicated by DFO, without consulting me, to Chalmers-Hunt (1960–1981) was not, in my opinion, a freshly dead individual as reported but a set specimen that someone had apparently thrown away. I did not mention it in my journal entry for that date. I wrote to Chalmers-Hunt to explain the circumstances and my opinion and he published this in his Additions and Corrections to volume 1 of his *The Butterflies and Moths of Kent*. Unfortunately, this was not picked up by Plant (1987), who included the record.

**Brimstone** *Gonepteryx rhamni*: W. S. R. Watson informed C-H that in 1978 he saw three between Eltham and Falconwood. John Reid (in litt.) reports that this butterfly has been common in spring over the past decade in and around his garden which backs on to Jackwood on Shooters Hill.

**Large white** *Pieris brassicae* and **small white** *P. rapae*: John Reid reports that these two species were common over the past decade in and around his garden adjoining Jackwood.

**Green-veined white** *P. napi*: reported by John Reid to be an occasional visitor to his garden by Jackwood over the past decade.

**Orange tip** *Anthocharis cardamines*: in 1977, R. G. Rigden saw a male of this species in Oxleas Wood (Chalmers-Hunt 1960–1981) and John Reid informs me that during the past decade he has occasionally seen this species in his garden adjacent to Jackwood.

**Purple hairstreak** *Neozephyrus (Quercusia) quercus*: having reported (Burton 1992) that this butterfly was abundant in the late 1850s in Shooters Hill Wood (now regarded as part of Oxleas Wood) but had not been seen since then, I was delighted to read that A. A. Allen (1999*b*) succeeded in refinding it there on 7 July 1999 when he swept a crippled female from herbage more or less under an oak. D. McKenzie (pers. comm.) reports that a small number were seen by Rupert Kaye, Richard Green and himself flying around the canopy of an oak near Gilbert Close, immediately south of Woolwich Common and close to Eltham Common, in, he believes, 1996. My friends and I never came across the species there in the 1940s and 1950s, but we could easily have overlooked it.

**Green hairstreak** *Callophrys rubi*: D. F. Owen informed C-H that in 1947 he saw this species on Shooters Hill although I did not find it mentioned in his journal for that year.

**Small copper** *Lycaena phlaeas*: A. A. Allen reported seeing an imago on Woolwich Common in 1979 (C-H) as well as recording its continued occurrence there as recently as 1991 (Allen 1992). D. McKenzie (pers. comm.) regularly recorded it there from 1993 to 2003.

**Large copper** *L. dispar*: As discussed in Plant (1987), C-H gives an account of the evidence for the possible occurrence of this species (British subspecies *dispar*) in the Shooters Hill area, apparently in the early nineteenth century. This is based upon an entry in the diary of C. and J. Fenn for 13 February 1862 stating that when they were examining the Laing collection 'we noticed a specimen of *C. hippothoe* said to have been taken at Eltham' and also on C. Fenn's statement at the meeting of the South London Entomological and Natural History Society on 9 March 1893 that he had heard of specimens of *Lycaena dispar* that had been captured at Shooters Hill Wood, near Woolwich, apparently fifty or more years ago. The name *hippothoe* was used for the large copper before Haworth renamed it *dispar* in 1803. Even in the 1840s, Shooters Hill Wood (now known as Oxleas Wood) would have been a most unlikely habitat for this fenland insect, although much of the nearby Plumstead Marshes would have provided very suitable conditions up to that period, but were little visited by Lepidopterists. Ruegg (1847) described parts of these marshes as expanses of pools, morasses and swamps with a 'vast amount of sub-aquatic vegetation'. I still found such habitats surviving along with large reed-beds and reed-choked ditches when I spent much time exploring them in the 1940s and 1950s. Incidentally, Wheatley (1991: 166) is incorrect in stating that 'much of the remaining Plumstead Marshes was lost to the Abbey Wood Housing Estate in the early 1900s'; building here was not begun until the late 1950s.

**Brown argus** *Aricia agestis*: D. F. Owen reported finding this species on Shooters Hill Golf Course in 1947 to C-H.

**Common blue** *Polyommatus icarus*: in Chalmers-Hunt (1960–1981), A. A. Allen reported that common blues were numerous on Woolwich Common in 1978 and abundant there in 1979. At Shooters Hill, John Reid states that it has been common over the past decade.

**Chalkhill blue** *Lysandra coridon*: in C-H there is a record of two seen by D. F. Owen on Shooters Hill in 1946. These were presumably met with on the golf course, but I have not found any reference to them in Owen's private journals.

**Duke of Burgundy fritillary** *Hamearis lucina*: reported in 1871 to have been present in West Wood, Shooters Hill, by E. Newman in C-H.

**Red admiral** *Vanessa atalanta*: John Reid informs me that in the past decade he has frequently seen this species in his garden adjacent to Jackwood on Shooters Hill.

**Painted lady** *Cynthia (Vanessa) cardui*: John Reid reports that over the past decade he has occasionally seen *cardui* in his garden adjacent to Jackwood.

**Peacock** *Inachis io*: Allen (1999*a*) reported that this butterfly can still be 'quite numerous on a warm spring day in and about the woods on Shooters Hill (Oxleas Wood, etc.) wherever stinging nettles fringe the paths', and John Reid (in litt.) reports that in the past decade he has commonly seen peacock butterflies in his garden adjacent to Jackwood. In Chalmers-Hunt (1960–1981) there is an interesting mention of hundreds having been seen in April 1843 between Shooters Hill and Foots Cray.

**Comma** *Polygonia c-album*: one seen at Falconwood in 1978 by W. S. R. Watson (C-H) and described by John Reid as common in and around his garden adjacent to Jackwood on Shooters Hill.

**Small pearl-bordered fritillary** *Boloria selene*: further to West's (1906) report of the presence of this species on Shooters Hill in the 1860s and 1870s, Chalmers-Hunt (1960–1981) refers to the statement by W. Grove (*fide* C. Fenn's 1861 diary) that it was abundant in West Wood at that period. He also drew attention to E. Newman's mention of Shooters Hill as a locality in his book *Illustrated Natural History of British Butterflies* (1871).

**Pearl-bordered fritillary** *B. euphrosyne*: in Burton (1992) it was stated that there have been no records of this species since it was described as 'not uncommon at Shooters Hill Wood' in 1858, and Fenn (1895) and West (1906) reported it there in the 1860s. However, having subsequently had access to the late D. F. Owen's (DFO) journals from the late 1940s, I learned that his brother, J. E. Owen, saw one in a then existing glade on the western side of that wood, now known as Oxleas Wood, on 19 May 1948. Neither DFO nor myself saw it there in these years, although we always looked out for it.

**Silver-washed fritillary** *Argynnis paphia*: further to my record (Burton 1992) of an imago seen in Oxleas Wood on 26 July 1946, I had overlooked D. F. Owen's notification to C-H that he had seen several in the Shooters Hill woods in 1946 and 1947.

**Speckled wood** *Pararge aegeria*: reported by A. A. Allen (in C-H) from Oxleas Wood in August 1979, the earliest date of which I am aware since the area was recolonized. In the past decade John Reid has found it to be common in the Jackwood area of Shooters Hill.

**Wall brown** *Lasiommata megera*: R. G. Rigden encountered this now scarce butterfly on Shooters Hill in 1977 or 1978 (C-H).

**Gatekeeper (hedge brown)** *Pyronia tithonus*: the following errors unfortunately occurred in the account of this species in Burton (1992): Sundridge Park, near Bromley, is five kilometres distant from Shooters Hill, not ten; Petts Wood and Joydens Wood are both six kilometres distant and Dartford Heath almost seven. Since the early 1990s the gatekeeper has succeeded in recolonizing Shooters Hill and John Reid reports that it has become common over the past decade.

**Meadow brown** *Maniola jurtina*: W. S. R. Watson (C-H) reported seeing several on the approaches to Falconwood in 1978 and John Reid rates it as still common on Shooters Hill. At Woolwich Common, D. McKenzie (pers. comm.) reports that it was always plentiful in the years 1993 to 2003.

**Small heath** *Coenonympha pamphilus*: when mentioning in Burton (1992) that Allen (1991) had found this butterfly 'plentiful at times' on Woolwich Common, I overlooked a note in my journal that it was numerous there on 26 May 1947. D. McKenzie (pers. comm.) saw it there regularly from 1993 to 2003.

**Ringlet** *Aphantopus hyperantus*: an early reference to this species at Shooters Hill is from Rennie, *Conspectus*, 13 (C-H).

## MOTHS (MACROLEPIDOPTERA)

**Ghost moth** *Hepialis humuli*: additional to the note in Burton (1992) is A.A. Allen's report to Chalmers-Hunt (1960–1981) that he 'occasionally found larvae in turf about Charlton and Shooters Hill'.

**Five-spot burnet** *Zygaena trifolii palustrella*: quoting C-H, Plant (1993) stated, I believe incorrectly, that the subspecies that occurred at Shooters Hill (including Oxleas Wood) in 1946 was *decreta*. In fact, as stated in Burton (1992) it was *palustrella*, as also was the case at Blackheath and Elmstead Wood. Subspecies *decreta*, now extinct in the London Area, occurred in the late 1940s in a small marsh, where its larval foodplant greater bird's-foot trefoil grew in profusion, at Sundridge Park, in the Borough of Bromley, which had dried out by the early 1960s (Burton 1995).

**Narrow-bordered five-spot burnet** *Z. lonicerae latomarginata*: I should have mentioned in my earlier paper that I caught on Shooters Hill Golf Course in 1947 an aberration in which the red colour was replaced by a yellowish shade, probably referable, according to C-H, to *citrina* Speyer.

**Six-spot burnet** *Z. filipendulae*: D. McKenzie (pers. comm.) reports seeing this species in most years between 1993 and 2003 at Woolwich Common.

**The festoon** *Apoda limacodes:* to the records in my 1992 paper, Plant (1993) adds a report of this species in West Wood in 1863 (West 1906) which I had overlooked.

**Large red-belted clearwing** *Synanthedon culiciformis*: C. Fenn's record of this clearwing on Shooters Hill (Burton 1992), probably refers to the 1860s.

**Fox moth** *Macrothylacia rubi*: in addition to the record in Burton (1992), C-H and Plant (1993) quote a record for Shooters Hill prior to 1828 published by J. F. Stephens (*Haustellum* **2**: 39).

**The drinker** *Euthrix potatoria*: Plant (1993) added a record of larvae of this moth having been found at Shooters Hill in 1909, the first record for the area.

**Chinese character** *Cilix glaucata*: DFO's journal entry for 6 May1948 revealed that I had overlooked one of the records in my own journal: he and I saw six imagines flying about half an hour before dusk at Shooters Hill Golf Course on that evening. Not previously recorded.

**Satin lutestring** *Tetheella fluctuosa*: further to the record from C. Fenn in Burton (1992), this was apparently based upon the report by A. H. Jones that he saw an imago in Shooters Hill (Oxleas) Wood on 5 August 1862 (C-H).

**Frosted green** *Polyploca ridens*: three larvae reported found on Shooters Hill in 1856 (H. H. Crewe in C-H), the only record for the area.

**March moth** *Alsophila aescularia*: in addition to the records in Burton (1992), it is perhaps worth adding DFO's reference in his journal to finding a male in Oxleas Wood on 11 March 1948 being eaten by a spider.

**Grass emerald** *Pseudoterpna pruinata*: W. West's record of this species in Burton (1992) referred to his finding of larvae on 'broom and furze' in Shooters Hill Wood (part of Oxleas Wood) in the late nineteenth century.

**The mocha** *Cyclophora annulata*: Plant (1993) quotes the record in Chalmers-Hunt (1960–1981) of two imagines found by C. Fenn in Shooters Hill Wood between 28 May and 2 June 1863. Not previously recorded and no subsequent records.

**Maiden's blush** *C. punctaria*: in addition to the records in Burton (1992), A. A. Allen found an imago in Oxleas Wood on 15 May 1956.

**Least carpet** *Idaea vulpinaria*: according to C-H, this increasingly common species has been found at Welling, adjacent to Shooters Hill. An addition to the area list.

**Treble brown spot** *I. trigeminata*: as well as the report of its occurrence at Oxleas Wood in the early 1980s, this species was previously found in 1952 at nearby Welling by A. J. Showler (C-H).

**Plain wave** *I. straminata*: the mid-nineteenth-century record in Burton (1992) attributed to C. Fenn in fact refers to an imago he found on Shooters Hill in 1886 (C-H).

**The mallow** *Larentia clavaria*: one male at an electric lamp in Oxleas Wood, 13 October 1951 (DFO). First record for the area.

**The phoenix** *Eulithis prunata*: one at an electric lamp in Oxleas Wood, 2 September 1951 (DFO). First record for the area.

**The chevron** *E. testata*: one at an electric lamp in Oxleas Wood, 28 August 1951 (DFO). First record for the area.

**Small phoenix** *Ecliptopera silaceata*: additional record: one at an electric lamp in Oxleas Wood, 28 August 1951 (DFO).

**Common marbled carpet** *Chloroclysta truncata*: additional observations: DFO's journal reported imagines abundant at the electric lamps at Oxleas Wood in September and October 1951, many of them melanic or semi-melanic among the various different forms. The latest seen were a few worn individuals on 19 October 1951.

**Broken-barred carpet** *Electrophaes corylata*: a single imago reported from Shooters Hill (Oxleas) Wood by C. Fenn in 1861 (C-H) was presumably the origin of its inclusion in Grinling et al.(1909).

**Beech-green carpet** *Colostygia olivata*: an earlier record than those given in Burton (1992) are of two found by C. Fenn in Shooters Hill (Oxleas) Wood on 30 July 1862, quoted from C-H by Plant (1993).

**Argent and sable** *Rheumaptera hastata*: Plant (1993) quotes Chalmers-Hunt's (1960–1981) remark that in the nineteenth century this moth was a common sight at a number of localities in Kent, including Shooters Hill (Oxleas) Wood (1862) and the former West Wood.

**Scallop shell** *R. undulata*: the mid-nineteenth-century record by C. Fenn mentioned in Burton (1992) referred to two he obtained on 27 June 1887 (C-H).

**The tissue** *Triphosa dubitata*: one was recorded by C. Fenn in the Shooters Hill woods on 6 April 1865 (C-H). An addition to the area list.

**Twin-spot carpet** *Perizoma didymata*: prior to West's (1906) report, C. Fenn found this species in Shooters Hill (Oxleas) Wood in 1862 (C-H).

**Toadflax pug** *Eupithecia linariata*: two females captured by DFO at electric lamps in Oxleas Wood on 5 September 1951. First record for the area.

**Tawny-speckled pug** *E. icterata subfulvata*: single females taken by DFO at light at Shooters Hill on 2 and 5 September 1951. First record for the area.

**The streak** *Chesias legatella*: one worn imago taken at light in Oxleas Wood by K. P. Whitehorn on 3 November 1948 (DFO). First record for the area.

**Small yellow wave** *Hydrelia flammeolaria*: W. West's (1906) report of this moth in West Wood was overlooked by me in my 1992 paper and also A. A. Allen's (1989) note concerning his discovery of it in Oxleas Wood. Although the larval foodplant is usually considered to be field maple *Acer campestre* in the south of England, Allen found an imago on 13 July 1988 when sweeping among young alders *Alnus glutinosa*, the normal foodplant in the north, and was strongly of the opinion that this was the larval foodplant being used here. As he remarked, field maple 'occurs in these woods very locally and sparsely, and not near the spot in question'. See also under field maple in Burton (1992). An addition to the Shooters Hill list.

**The seraphim** *Lobophora halterata*: prior to the discovery of this species in Oxleas Wood in the early 1980s (Burton 1992), A. A. Allen had noted it on tree trunks in the Shooters Hill woods on 11 July 1955 and 15 May 1956 (C-H).

**Clouded magpie** *Abraxas sylvata*: C-H reported J. F. Stephens' remark in *Haustellum* 3: 246 (1831) that he possessed a specimen captured on Shooters Hill, the first record for Kent and an addition to the Shooters Hill list.

**Scorched carpet** *Ligdia adustata*: C-H cites a statement in the *Proceedings of the South London Entomological and Natural History Society* for 1886 that the larva of this moth had been recorded in the Shooters Hill district.

**Latticed heath** *Semiothisa clathrata*: in my 1992 paper I overlooked an entry in my journal that this moth was numerous on Woolwich Common on 26 May 1947.

**Barred umber** *Plagodis pulveraria*: C. Fenn recorded in his diary finding imagines in Shooters Hill (Oxleas) Wood from 20 May to 6 June 1861 and on 5 May 1863 (C-H).

**Lilac beauty** *Aperia syringaria*: Fenn recorded in his diary that A. H. Jones found this species on Shooters Hill on 12 July 1862 (C-H). An addition to the Shooters Hill list.

**August thorn** *Ennomos quercinaria*: this species was described by various authors in the nineteenth and the early years of the twentieth centuries as being very common in the south-east London area without specifically mentioning Shooters Hill, but it must certainly have been present. Not previously included in my Shooters Hill list.

**Canary-shouldered thorn** *E. alniaria*: additional to Paul Sokoloff's report in 1984 of this species in Oxleas Wood, DFO's journal recorded his capture of nine males at electric lamps at the edge of that wood between 2 September and 3 October 1951.

**Dusky thorn** *E. fuscantaria*: DFO's journal also recorded his capture of single males at electric lamps at the edge of Oxleas Wood on 28 August 1951 and 3 October 1951.

**Early thorn** *Selenia dentaria*: further to the information in my 1992 paper, DFO captured a male at an electric lamp at the edge of Oxleas Wood on 5 September 1951.

**Orange moth** *Angerona prunaria*: an entry in C. Fenn's diary records finding an imago of this now extremely rare, if not extinct, moth in the London Area in Shooters Hill (Oxleas) Wood on 24 June 1862. An addition to the Shooters Hill list.

**Small brindled beauty** *Apocheima hispidaria*: listed for Shooters Hill in the *Victoria County History of Kent* (1908) according to C-H. No other details. An addition to the Shooters Hill list.

**Pale brindled beauty** *A. pilosaria*: as mentioned by C-H, but omitted from my 1992 paper, I collected four examples of the melanic aberration *monocharia* Staudinger in the Shooters Hill woods on 30 March 1947.

**Oak beauty** *Biston strataria*: an addtional record: a male at light in Jackwood on 6 April 1948 (DFO).

**Spring usher** *Agriopis leucophaearia*: according to Chalmers-Hunt (1960–1981), the first record of this species in Kent dates from an entry in C. Fenn's diary for 5 March 1861 when he noted it at the now-vanished West Wood on the eastern side of Shooters Hill.

**Scarce umber** *A. aurantiaria*: contrary to the statement in Burton (1992), before 1984 a male was found by DFO at rest on a fence in Oxleas Wood on 7 December 1947.

**Dotted border** *A. marginaria*: as well as Oxleas Wood, also found in Jackwood by DFO, on 6 April 1948 (two males).

**Small engrailed** *Ectropis crepuscularia*: in 1900 J. W. Tutt reported the presence of this species on Shooters Hill (C-H). An addition to the Shooters Hill list.

**Broad-bordered bee hawk-moth** *Hemaris fuciformis*: as stated in C-H and Plant (1993), larvae of this species were found on honeysuckle *Lonicera periclymenum* on Shooters Hill in 1856 and imagines were seen in West Wood in May 1866 (West 1906). I mistakenly attributed the latter to the narrow-bordered bee hawk in Burton (1992), due to confusion over the scientific synonyms employed by Grinling et al. (1909).

**Iron prominent** *Notodonta dromedarius*: larvae were found on Shooters Hill by H. H. Crewe in the mid nineteenth century and at nearby Welling on 5 August 1952 by A. Heselden (C-H).

**Great prominent** *Peridea anceps*: larva reported found on oak at Shooters Hill in 1856 by H. H. Crewe (C-H), the only record for the area.

**Coxcomb prominent** *Ptilodon capucina*: in addition to the reports in Burton (1992), the first record of this species in Kent, in 1856, (C-H), was from Shooters Hill where DFO caught single moths at light in Jackwood on 30 August and 14 October 1951.

**Lunar marbled brown** *Drymonia ruficornis*: larvae were reported found on Shooters Hill in the mid nineteenth century by H. H. Crewe and C. Fenn (19 July 1862) in C-H, the only records for the area.

**Small chocolate-tip** *Clostera pigra*: as well as the record in my 1992 paper, C-H and Plant (1993) quote a report from *The Zoologist* of larvae having been found on aspen *Populus tremula* in Crown Woods on 23 June 1855.

**Wood tiger** *Parasemia plantaginis*: reported by C. Fenn in 1861 to have occurred formerly in West Wood (C-H). An addition to the Shooters Hill list.

**Ruby tiger** *Phragmatobia fuliginosa*: reported by C. Fenn in 1861 from West Wood (C-H). An addition to the Shooters Hill list.

**Shuttle-shaped dart** *Agrotis puta*: J. W. Tutt recorded the aberration *radius* Haworth at Shooters Hill (C-H).

**Broad-bordered yellow underwing** *Noctua fimbriata*: DFO's journal records that he captured a 'well-battered' imago of this species at light in Jackwood on 5 September 1951.

**Dotted clay** *Xestia baja*: C. Fenn (C-H) recorded in his diary that this was the commonest species in Shooters Hill (Oxleas) Wood on 30 June 1862.

**Green arches** *Anaplectoides prasina*: C. Fenn noted in his diary that he found an imago of this species in Shooters Hill (Oxleas) Wood on 3 June 1863 (C-H).

**Pale shining brown** *Polia bombycina*: the record from Grinling et al. (1909) in Burton (1992) refers to an imago found by A. H. Jones on Shooters Hill on 25 June 1863.

**Silvery arches** *P. trimaculosa (hepatica)*: C. Fenn recorded in his diary that A. H. Jones found an imago in Shooters Hill (Oxleas) Wood on 22 June 1862 (C-H).

**Antler moth** *Cerapteryx graminis*: seven captured by DFO between 28 August and 5 September 1951. New to the Shooters Hill list.

**Blossom underwing** *Orthosia miniosa*: further to my 1992 paper, an entry in DFO's journal in 1947 remarks that this species 'abounds as a larva' in the woods of Shooters Hill.

**Twin-spotted quaker** *O. munda*: in addition to the notes in Burton (1992), an entry in DFO's journal refers to finding a male feeding from a nine-inch square of sap oozing from a sycamore *Acer pseudoplatanus* in Oxleas Meadow on 16 March 1948.

**Minor shoulder-knot** *Brachylomia viminalis*: C. Fenn recorded in his diary that A. H. Jones captured three imagines in Shooters Hill (Oxleas) Wood on 26 July 1862 (C-H). An addition to the Shooters Hill list.

**Black rustic** *Aporophyla nigra*: C-H considered the report by J. F. Stephens in *Haustellum* (1828–1844, 2: 11) of the finding of this species on Shooters Hill as probably erroneus.

**Green-brindled crescent** *Allophyes oxyacanthae*: one found by DFO on a fence near an electric lamp in Jackwood on 3 November 1948 is an addition to the Shooters Hill list.

**The satellite** *Eupsilia transversa*: between 20.00 and 21.00 hrs on 13 March 1948 DFO collected eleven imagines of both sexes in Oxleas Meadow from the same patch of oozing sap where he collected the *Orthosia munda* mentioned under that species above. On 16 and 19 March 1948 he found four more there.

**Orange upperwing** *Jodia croceago*: Plant (1993) gives a reference from C-H to the occurrence of this moth at Shooters Hill (Oxleas) Wood in the mid nineteenth century, an addition to the list for the locality.

**The chestnut** *Conistra vaccinii*: between 20.00 and 21.00 hrs on 13 March 1948 DFO found nine imagines imbibing from the same patch of oozing sap on a sycamore in Oxleas Meadow as he found eleven *Eupsilia transversa*. On 16 March 1948 he found thirteen more (three males and ten females), plus two on 19 March 1948.

**The sallow** *Xanthia icteritia*: one caught by DFO at an electric lamp in Jackwood constitutes an addition to the Shooters Hill list.

**Grey dagger** *Acronicta psi*: J. W. Tutt recorded the aberration *cuspis* from Shooters Hill (C-H).

**The coronet** *Craniophora ligustri*: C. Fenn's record of this species in Burton (1992) was apparently based upon his finding imagines in Shooters Hill (Oxleas) Wood on 24 June and 12 July 1862 (C-H).

**Heart moth** *Dicycla oo*: C.Fenn recorded in his diary that A. H. Jones took an imago at rest on an oak on Woolwich Common in 1865. Also recorded from Shooters Hill in 1887 by J. W. Tutt (C-H).

**Cloud-bordered brindle** *Apamea crenata*: C. Fenn (C-H) recorded in his diary the following data concerning imagines of this species in Shooters Hill (Oxleas) Wood: two, 16–28 May 1863, plentiful on 3 June 1863, a few at sugar on 18 June 1864, one on 19 June 1865, two, 30 June–8 July 1890, one 18 June 1892, common at sugar on 30 June 1892.

**Clouded brindle** *A. epomidion*: C. Fenn (C-H) recorded in his diary that in Shooters Hill (Oxleas) Wood he took five moths at sugar on 24 June 1862, others on 8 July 1890, and that they were common at sugar on 30 June 1892.

**Dusky brocade** *A. remissa*: C. Fenn recorded in his diary that imagines were common at sugar in Shooters Hill (Oxleas) Wood on 30 June 1892. An addition to the Shooters Hill list.

**Rustic shoulder-knot** *A. sordens*: contrary to the statement in my 1992 paper that there have been no records since those of J. W. Tutt in 1907, an entry in DFO's journal records the finding by J. E. Owen of a male at rest on an oak in Oxleas Wood on 19 May 1948.

**Small dotted buff** *Photedes minima*: C. Fenn's diary records that A. H. Jones caught several imagines in Shooters Hill (Oxleas) Wood on 28 July 1862 (C-H). An addition to the Shooters Hill list.

**Small wainscot** *P. pygmina*: reported from Shooters Hill (Oxleas) Wood in the mid nineteenth century (C-H). An addition to the Shooters Hill list.

**Dusky sallow** *Eremobia ochroleuca*: two moths were found at Welling on the eastern border of Shooters Hill on 14 August, 1952 by A. Heselden (C-H). New to the Shooters Hill list.

**Flounced rustic** *Luperina testacea*: in his diary C. Fenn (C-H) recorded finding this species on Shooters Hill in 1862. Nearly a century later, D. F. Owen's journal records that it was common at electric lamps in Jackwood in September 1951. An addition to the Shooters Hill list.

**Ear moth** *Amphipoea oculea*: single males caught by DFO at electric lamps in Jackwood in early September 1951 constitute first records for this species at Shooters Hill.

**Marbled white spot** *Protodeltote pygarga*: C. Fenn recorded in his diary that A. H. Jones found an imago in Shooters Hill (Oxleas) Wood on 12 July 1862 (C-H). An addition to the Shooters Hill list.

**Scarce silver-lines** *Bena prasinana*: prior to the 1947 record in Burton (1992), C-H lists a report of it at Shooters Hill in 1917 or 1918.

**Green silver-lines** *Pseudoips fagana britannica*: contrary to the statement in Burton (1992) that this moth was not noted at Shooters Hill in the period 1943–1958, an entry in DFO's journal records that he found a fully grown larva on an oak there on 24 September 1951.

**Golden plusia** *Polychrisia moneta*: C-H reported that this species was noted by A. Helseden at Welling, adjacent to Shooters Hill, on 23 August 1952. An addition to the area list.

**Plain golden y** *Autographa jota*. C. Fenn's diary records that he noted this species on Shooters Hill on 27 June 1889 (C-H). An addition to the Shooters Hill list.

**Red underwing** *Catocala nupta*: as well as the male recorded by DFO and myself in Jackwood on 19 October 1951, an entry in the former's journal, to which I subsequently had access, reveals that he also recorded two imagines at electric lamps in Jackwood on 3 October that year.

**Dark crimson underwing** *C. sponsa*: in addition to Barrett's (1893–1907) statement concerning this species referred to in Burton (1992), Plant (1993) adds the statement by J. F. Stephens (*Haustellum* **3**: 134) that it was known at Shooters Hill prior to 1830.

**Mother Shipton** *Callistegi mi*: in addition to my statement that this moth was 'frequent' on Shooters Hill Golf Course in the late 1940s, DFO reported to C-H that it was abundant there in 1947.

## Comments

Since the publication of my 1992 paper, a further three species of butterflies to the thirty-two previously recorded and thirty-seven species of moths have been added to the list of Macrolepidoptera so far recorded at Shooters Hill, nineteen of them characteristic of woodland, especially ancient woodland, thus bringing the total of such species there to 131 (41.6 per cent). Another eight are associated with woodland edge as well as scrub and other marginal habitats. The grand total of Macrolepidoptera species which have been reported from Shooters Hill since 1773 now stands at 315. Many of the species listed, but not reported since the 1950s, could well be refound by searching and light-trapping, plus a number of other widespread and common species in the London Area which have not yet been recorded. I hope that, in due course, someone will be able to prepare a list of the Microlepidoptera recorded in the area, which will probably amount to around 150 species. Much of these attractive woodlands are still intact. However, the extensions to the golf course since the 1950s has resulted in it being a much less attractive habitat than it once was. Nevertheless, the adjacent Woodlands Farm, which, as described above, has produced a number of bird species of interest in recent years, has not had its Lepidoptera properly investigated and might well hold a variety of interesting species associated with marginal land. This comment applies equally well to Woolwich Common.

## Acknowledgements

I am much indebted to Desmond McKenzie and G. A. J. (John) Reid for generously supplying me with their observations from recent years. I am also grateful to Laura Schmidt-Thomée for heip with the computer technology in respect of which I am still a novice.

## References

ALLEN, A. A. 1989. *Hydrelia flammeolaria* Hufn. (Lep.: Geometridae) apparently breeding on alder near London. *Entomologist's Rec. J. Var.* **101**: 40–41.

ALLEN, A. A. 1991. Butterflies in the Woolwich (S.E. London) district, 1990. *Entomologist's Rec. J. Var.* **103**: 77–78.

ALLEN, A. A. 1992. Butterflies in the Woolwich (S.E. London) district, 1991. *Entomologist's Rec. J. Var.* **104**: 47–49.

ALLEN, A. A. 1999*a*. Notes on the comma *Polygonia c-album* (L.) and peacock *Inachis io* (L.) butterflies in the south-east London area. *Entomologist's Rec. J. Var.* **111**: 44–45.

ALLEN, A. A. 1999*b*. The purple hairstreak *Quercusia quercus* L. (Lep.: Lycaenidae): first modern record for Oxleas Wood SSSI, Shooters Hill, south-east London. *Entomologist's Rec. J. Var.* **111**: 274.

BARRETT, C. G. 1893–1907. *The Lepidoptera of the British Isles.* Vols **1–8**. London.

BURTON, J. F. 1992. Notes on the fauna and flora of Shooters Hill, including Oxleas Wood SSSI, with particular reference to the years 1943–1958. *Lond. Nat.* **71**: 75–115.

BURTON, J. F. 1995. The flora and fauna of Elmstead Wood and Sundridge Park, Bromley, south-east London, in the 1940s, with some earlier and later records. *Lond. Nat.* **74**: 83–112.

CHALMERS-HUNT, J. M. 1960–1981. *The butterflies and moths of Kent.* 3 vols. Arbroath and London. (Originally published as supplements to *Entomologist's Rec. J. Var.* **72–93**.)

FENN, C. 1895. On the gradual disappearance of Lepidoptera from south-eastern London and its neighbourhood. *Entomologist's Rec. J. Var.* **6**: 228–232.

GRINLING, C. H., INGRAM, T. A. and POLKINGHORNE, B. C. (eds). 1909. *A survey and record of Woolwich and west Kent.* Woolwich.

LNHS. 1992–2008. *London Bird Report.* **56** (for 1991)–**69** (for 2004).

LNHS. 1992–2008. *Ornithological Bulletins.*

McKENZIE, D. (in press). The birds of the Charlton Area, 1993–2003. *Lond. Bird Rep.*

OLIVER, P. 2007. Breeding buzzards. *Newsl. Lond. nat. Hist. Soc.* No. 201: 8, April.

PLANT, C. W. 1987. *The butterflies of the London Area.* London Natural History Society, London.

PLANT, C. W. 1993. *Larger moths of the London Area.* London Natural History Society, London.

RIGDEN, R. G. 1955. The fishes, amphibians, reptiles and mammals of Woolwich and surrounding localities. *Lond. Nat.* **34:** 48–53.

RUEGG, R. 1847. *Summer evening rambles round Woolwich.* Privately printed.

SELF, A. 2004. Honey buzzard influx autumn 2000. *Lond. Bird Rep.* **65**: 191–198.

TEAGLE, W. G. 1963. Mammals in the London Area. A report for 1960, with some records for the years 1957–1959. *Lond. Nat.* **42**: 42–56.

TEAGLE, W. G. 1964. Mammals in the London Area 1961. *Lond. Nat.* **43**: 119–135.

WEST, W. 1906. The Lepidoptera of the southeastern district of London. *Entomologist's Rec. J. Var.* **18**: 141–143, 170–173, 198–201, 229–236.

WHEATLEY, N. 1991. The birds of Thamesmead. *Lond. Bird Rep.* **55**: 164–180.

# Book review

***Wye Valley***. George Peterken. New Naturalist No. 105, Collins, London. 2008. 466 pp. Softback, £25, ISBN 978 0 00 716069 3; hardback, £45, ISBN 978 0 00 716068 6.

This is the latest in a series of New Naturalist volumes describing ecologically rich regions of the British Isles. Most recently, there was Rosemary Parslow's evocative account of *The Isles of Scilly* (New Naturalist No. 103) which was reviewed in *The London Naturalist* **86**: 32 last year.

George Peterken was an obvious choice to cover the Wye Valley. Well known for his classic accounts of woodland ecology and management: *Woodland Conservation and Management* (1981) and *Natural Woodland* (1996), he has known the area for almost forty years and lived there since 1993.

The book focuses on the Lower Wye Valley (there is little coverage of the upper reaches of the River) and starts by giving a broad account of the evolution of its unique landscape. There is a chapter on the physical background, covering geology, landform, hydrology, climate and soils. Consecutive chapters then describe the broad range of habitats present in the Valley — woodlands and their management; grasslands and associated farmland; rivers, streams and ponds; and cliffs, quarries, linear and artificial habitats. Two further chapters cover wild plants and fungi, and wild animals. A final chapter discusses management and conservation.

The woodland chapter includes a detailed account of the wonderful ancient woods that clothe the steep limestone slopes of the Wye Valley gorge — one of the most important concentrations of native woodland in Britain. Lady Park Wood, in the upper part of the gorge, is given particular attention. Here, a strict policy of non-intervention has been followed since 1944, and changes in the vegetation have been regularly monitored. This has given important insights into how 'natural' woodland works. Although 'we will never be able to shut out the influences of modern life completely', such woods, 'together with the landforms and the rivers, remain our closest links with the primeval landscape'.

The book is copiously illustrated with high quality colour photographs, paintings, maps and diagrams. All these usefully augment the text. The iconic view from Symonds Yat Rock (p. 2) will be familiar to many readers, but my own favourite photograph (p. 27) shows the view from one of the Seven Sisters (limestone crags) looking steeply down to the River. This brought back happy memories of a Wild Flower Society outing back in 1985 with Trevor Evans (botanical recorder for Monmouthshire). Trevor is photographed at home in his Chepstow garden (p. 411) with autumn lady's-tresses carefully staked on his lawn.

For those of us, like myself, who cherish such fond memories of fleeting visits to the Wye Valley, this book will undoubtedly encourage us to return. It is a most valuable addition to the New Naturalist series.

David Bevan

# Spider records for the London Area in 2007

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## Abstract

New and interesting spider records in 2007 for the London Area, including parts of London within the London Natural History Society area at the edge of Essex, are detailed. There were two new records for Middlesex but none for the county of London.

## Introduction

In 2007 altogether 153 species were recorded in the two counties of London and Middlesex (compared with 211 in 2006 and 192 in 2005), of which two were new to Middlesex but none was new to London. The lower number of species is partly a reflection of very poor weather, especially in May, and partly due to the cessation of some pitfall-trapping after twelve-month periods.

Records are credited to individuals; all records not credited are by the writer. Trapped means pitfall-trapped unless otherwise stated.

Nomenclature and the order of families are according to Merrett and Murphy (2000) with amendments by Harvey et al. (2002).

## Spider activities in 2007

The Society's winter foray to Old Park Meadow and Wood, Harefield on 10 December 2006 was, as usual for these winter forays, cold but successful, producing nineteen species including the locally scarce crab-spider *Diaea dorsata* and the bird-dropping spider *Cyclosa conica*.

The summer was often wet and cold, especially May, and several spider forays were either cancelled or called off early. The Society's foray to Keston and Hayes Commons was abandoned due to bad weather. A foray for the Hampstead Heath Study group in May was cancelled and reconvened in September. On 3 June, the first sunny day of the summer it seemed, there was a foray to Hampstead Heath with the Heath and Old Hampstead Society attended by twenty or so members of that Society.

The annual foray as part of the Creepy-Crawly Week at Mile End Park was also cancelled due to rain.

Some forays were arranged with local authority ecologists; these are also open to members and a useful way of publicizing the Society. A foray at Claybury Woods (London Borough of Redbridge) started off well, with about fifteen participants, including seven primary-age children, sweeping and searching in sunshine on the meadow. Several specimens of *Philodromus albidus* and five other common species were swept from the long grass. However, by the time we entered the actual wood, storm clouds had built up and torrential rain started. It got so dark that it wasn't possible to see well enough to catch any specimens so the trip was aborted. At Cranford Park (London Borough of Houslow) on 10 June, there was a strange foray when your recorder was the sole attendee! However it was, for a change, a hot sunny day and thirteen species were found, mainly by sweeping, including *Lathys humilis* and *Philodromus praedatus*, both uncommon in the London Area.

On 31 August, following a tip-off from David Goode, the author visited the Embankment across the river from the London Eye, and found a substantial colony of the spectacular *Segestria florentina* whose webs festoon the wrought-iron lamp standards. This is very cheering, as the colonies at Charterhouse Square and Dean's Yard appear to have diminished, and no other new sites (in London) have been found in recent years.

Later on in the year there were some successful forays. At Tower Hamlets Cemetery Park on 15 September an enthusiastic group of about twenty-five, including quite a few children, turned up to enjoy a warm, sunny afternoon and find lots of spiders. Altogether twenty-one species were found, including some enormous specimens of the common garden spider *Araneus diadematus* (Araneidae) and, on the Scrapyard Meadow, a newly created grassland site, a single wasp spider *Argiope bruennichi* (Araneidae), and several of its characteristic egg-sacs shaped like Greek vases. Also swept off low vegetation in the Park were several specimens of the tiny green *Nigma walckenaeri* (Dictynidae) of both sexes.

A foray for the Hampstead Heath Study Group, rearranged from May, finally took place on 30 September, when a small group of seven members spent a couple of hours in warm sunshine on Sandy Heath. One or two interesting finds were made. *Labulla thoracica* (Linyphiidae), reported historically by Savory and Le Gros (1957) in their Arachnida of London had not been seen for over fifty years; and *Drapetisca socialis* (Linyphiidae), a male of which was found by Amanda Waterfield walking on the bark of a pine tree, had not previously been recorded from the Heath at all! Finally, a successful winter foray was held at Brent River Park in Ealing, where many individuals of *Nigma walckenaeri* were found with webs spun across ivy leaves.

Pitfall trapping has continued at Queen's Wood, Mile End Park, Tower Hamlets Cemetery, Mitcham Common (London Borough of Merton), Hainault Forest Lodge and West Ham Park. Several spiders that are either previously unreported or very rare in the London Area have been found. These include *Steatoda phalerata* (Theridiidae; associated with ants) and three species of *Agroeca* (Clubionidae), all at Mitcham Common (Surrey). At West Ham Park (vice-county 18, South Essex) the rare *Walckenaeria dysderoides* (Linyphiidae) was trapped (the only previous record in London being from Oxleas Wood), as were specimens of a scarce acid-grassland specialist *Argenna subnigra* (Dictynidae) and Nationally Notable B species *Syedra gracilis* (Linyphiidae). At Hainault Forest Lodge several specimens of the scarce *Trachyzelotes pedestris* (Gnaphosidae) were trapped.

## New records

DICTYNIDAE

*Nigma puella.* Shortly after the Society's foray to Harefield in December, one member (P. Taylor) visited the nearby Hillingdon & Uxbridge Cemetery and found a female specimen of *Nigma puella*, a spectacular and Nationally Notable spider previously only found in the London Area at Regent's Park and Greenwich Park, and a new record for Middlesex.

THERIDIIDAE

*Steatoda nobilis.* Mick Massie found an immature male of a large tangle-web spider *Steatoda nobilis* at Hampton Court in August; this is the first record of the species in the London area and a new record for Middlesex.

## Acknowledgements

I would like to thank Dr Peter Merrett and Peter Harvey for identifying some of these specimens.

## References

HARVEY, P. R., NELLIST, D. R. and TELFER, M. G. (eds). 2002. *Provisional atlas of British spiders (Arachnida: Araneae)*, 2 vols. Biological Records Centre, Huntingdon.

MERRETT, P. and MURPHY, J. A. 2000. A revised checklist of British spiders. *Bull. Br. arachnol. Soc.* **11**(9): 345–357.

SAVORY, T. H. and LE GROS, A. E. 1957. The Arachnida of London. *Lond. Nat.* **36**: 41–50.

# Survey of Bookham Common

## SIXTY-SIXTH YEAR

## Progress Report for 2007

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### **Introduction** (Stuart Cole)

It is due to the death in January 2008 of Dr Ian Menzies that I have been asked to put together the Bookham Common report for 2007. During the winter of 2006/7 I became a regular on the monthly survey meetings and field study days at Bookham and made my all too short-lived acquaintance with Ian. These were my first visits to the common since the 1960s. It seemed to me that the place hadn't changed much in all that time, but that is due to all the work of The National Trust wardens, in consultation with others, including the LNHS, who have managed the vegetation so as to retain the mix of habitats and prevent Bookham from becoming a solid block of climax forest.

Ian's special interest was Coleoptera, and during 2007 he, together with his two co-authors, Max Barclay and Roger Booth of the Natural History Museum, completed work on the list of beetles that have been recorded at Bookham Common compiled from records going back to the 1940s. The tally of species over that time is more than 1,500. In the context of the comparatively impoverished beetle fauna of Britain that is a high number for an area of 375 acres (152 hectares; only a little larger than Kew Gardens), representing about 40 per cent of the described species of these islands.

### **Vegetation** (Steve Mellor)

We have again been pleasantly surprised to find a new native taxon in the botanical survey area of Bookham Common for addition to the accumulative plant list. A single bee orchid *Ophrys apifera* was reported to us by The Friends of Bookham Common Support Group in a scrub edge in Division R not far from the Central Ditch. Although it was trampled flat before it had finished flowering and largely eaten before the seed capsules had ripened, it was a very robust plant with at least nine flowers that set seed. The alluvial soil here, washed down from the North Downs in times past, is clearly sufficiently basic to accommodate the orchid's needs.

The march of alien plants on to the Common has, as expected, continued unabated with four first-time appearances this year. A few robust plants of turnip *Brassica rapa* grew in the wood edge near the southern end of Common Road South in Division S. Once considered a native, *B. rapa* is now generally believed to be an alien in all its forms. A single sun spurge *Euphorbia helioscopia* was found in the car park surround off Cobham Road in Division J. Weld *Reseda luteola* spread through the fence from Bookham Station to form a small colony in Division R in an open area recently cleared of scrub. I will stick my neck out in saying that three small clumps of bluebell, seen near the middle of Division R beside the Isle of Wight Ditch, were Spanish bluebell *Hyacinthoides hispanica*.

Uncertainty as to the characters that define *Hyacinthoides hispanica* have arisen because the hybrid *H.* × *massartiana* between Spanish and our native bluebell has often been sold by garden centres incorrectly as *H. hispanica*. Additionally, the hybrid is fertile and back crosses can result in a continuous range of characters between the parents. The familiar native bluebell *H. non-scripta* has an arching flower stem carrying narrow, drooping or pendant flowers in a one-sided inflorescence. Petals (perianth segments) are fused into a narrow, near-cylindrical tube and are markedly reflexed at the tip. In contrast, *H. hispanica* and a form of the hybrid that is commonly seen naturalized in Britain have an erect flower spike with erect or spreading flowers arranged more-or-less symmetrically around the inflorescence. In *H.* × *massartiana* the perianth segments are spreading and the degree of spreading increases towards the tip (sometimes with reflexing) giving the perianth a bell-shaped form. Perianth segments on *H. hispanica* are widely spreading and the tube separates into free lobes for most of its length. The degree of spread does not increase towards the tip of the perianth so that it is shaped like a shallow bowl. *H. hispanica* is uncommon as a naturalized taxon, nor is it commonly seen in gardens. When one is familiar with the morphological character of *H. hispanica*, it becomes clear that the hybrid shows intermediate characters between its parents which is as expected.

## **Birds** (Alan D. Prowse)

In the earlier years of the survey, Geoffrey Beven recorded that coots did not winter at Bookham. At both ends of 2007 they stayed on Isle of Wight and Western Hollow Ponds, perhaps reflecting recent milder winters. Two firecrests were seen on 5 January (ADP), presumably the same birds as in December 2006, which had been seen by others during that month. At the other end of the year another firecrest was seen, again by the Isle of Wight Pond, on 7 November. A willow tit was photographed by Graham Carey on Bayfield Plain on 7 January, only the fifth record for the Common since 1995 of this increasingly rare species.

Some records during the year show the changing pattern of commoner species. A great black-backed gull on 20 January was the first record from the Common, and all gull records have increased in recent years. Cormorants were not recorded as fly overs until 1991, but there have been a number each year lately, with five seen on 4 May. A greylag goose flying over on 20 January was the first since 10 April 1949; this could have been a genuinely wild winter visitor but more probably from the increasing feral population.

The first lesser whitethroat of the season was on 10 April, an early date.

A juvenile male goshawk was seen at the northern border of the Common and over a field of Chasemore Farm on 7 November (ADP). The status of this species on the Common is interesting. The previous accepted record was on 27 August 1984. Pairs are known to have nested nearby at Effingham and Polesden Lacey in the past decade. A local falconer, who flies a gos, has told me in the last decade of sightings of birds he has seen going to roost on the Common, and birds high overhead on occasions which his bird has spotted. Each year reports come from good observers of birds which were almost certainly gos, but not quite clinched. Long watches for displays in spring have been unsuccessful, so breeding is not suspected, but occasional, possibly yearly, visits are probable despite lack of acceptable written evidence.

**Breeding season.** The heronry had twenty successful nests. Only two were at the top end of Tunnel Path, with the majority in the woodland to the north of Isle of Wight Pond. It appears that an older pair goes on using its traditional nest when the others move, and recruitment takes place at the newer site. There have only been refurbished nests in recent years in the older areas of the colony, which are several hundred metres from the present main site.

Coots and little grebes nested on Isle of Wight, Western and Eastern Hollow Ponds. A male mandarin duck was on Western Hollow Pond on 5 May.

Although contact is made with this species each breeding season and in autumn, it is uncommon.

Despite the continuing decline reported nationally for the lesser spotted woodpecker, it is still present on the Common and in its vicinity. A pair could be heard near the Fetcham road car park, and visited the feeder in a local garden. Birds were heard calling near the pond on Bayfield Plain, and in the Commonside area. Ruth Iredale reported a male visiting her garden regularly for the woolly aphis on an old apple tree in late July and early August, accompanied by the female on one occasion. This location is a few hundred metres from the south east edge of the Common. It would appear that three pairs at least are still in the area.

There were seven pairs of nightingales. The distribution on the Common is changing. There was none in the usual area on Central Plain this year, following the clearances there, but two pairs nested along the border with South East Wood. One pair on the Isle of Wight Plain was in scrub prepared for the species in accordance with previous recommendations (Prowse 2002). A pair used a new site on Western Plain, in addition to three pairs at the traditional northern end of that area. With the scattering of pairs comes a reduction in competitive singing, so monitoring has become more difficult if tapes of the calls are not used.

As usual, a pair of sparrowhawks nested in South East Wood, fledging two male young about 10 July. Lance Gibson observed that the food brought to the young included squab woodpigeons, around 15 – 17 days old and far from fledging. These would be too heavy for the male sparrowhawk to carry (at about its own weight), so the female was taking young from woodpigeons' nests for her young. Other pairs of sparrowhawks are in the area.

Among other birds of prey, a kestrel pair wintered and displayed in spring over the Isle of Wight and pond area, with another pair at the northern area and adjacent farmland. Buzzards occurred regularly, with eight seen on 15 February, and four in one thermal on 4 May. Although displaying pairs are regularly witnessed, for example over Hill House Wood, no proof of breeding on the Common has been forthcoming.

A highlight of the breeding season was a spotted flycatcher seen on 8 July by Paul Goodman in the High Point Path area. It was calling, and collecting food, so breeding is possible. Paul visited the area again on 14 July but did not find the birds. This is only the sixth record since 1991, none of the previous ones suggesting breeding. With the widening of the rides on the Common, and the beneficial effects on the butterflies and other insects, we can but hope to see this decreasing species from time to time.

Greenfinches were thought not to breed in the early years of the survey, with small numbers then on the plains from 1964 to 1978. There were none on the Common in the mid 1990s (Prowse 1998), though in gardens nearby, but a pair bred in 1999. With the partial clearance of the plains and establishment of grazing, there are now breeding pairs each year on Central, Bayfield, Isle of Wight, and Western Plains. House sparrows are no longer found by the Grange Hotel, though two were at a feeder on the allotments on 23 April. In contrast to former times, starlings are rarely seen on the Common, though post-breeding flocks of up to a hundred birds can be found on the farmland and amenity land to the north.

Regular meetings with The National Trust are producing useful exchanges of information which contribute to present and future management.

## References

PROWSE, A. D. 1998. Birds of Bookham Common in the breeding season. *Lond. Nat.* **77:** 177–187.

PROWSE, A. D. 2002. Nightingales in scrub at Bookham Common: their habitat and conservation. *Surrey Bird Rep. 1999*: 116–130.

## Invertebrate Field Study Days

### Dragonflies and other insects Field Study Day, 14 July 2007

(Neil Anderson)

A good attendance of about fifteen people on a day that started cloudy but with sunny spells later and a top temperature of 22°C.

As usual a good selection of butterflies was observed; some seventeen species in total. Vanessids were low in number with only two red admirals plus a single comma seen. Small tortoiseshells have dramatically declined in recent years, particularly in south-east England, with the recent arrival of a parasitic fly, *Sturmia bella*, to our shores often cited as a cause of this decline.

About fifteen silver-washed fritillaries were observed and this is a species that is doing well currently and is always a joy to see it gliding through glades and nectaring on bramble blossom. Quite a few purple hairstreaks were noted but what was fascinating was the fact that several were attracted to the sweet-smelling flowers of small-leaved lime *Tilia cordata*. The day's tally also included the regal purple emperor near the well-known master tree, and three white admirals.

Moths noted were a blood-vein resting on a bracken frond, a lesser yellow underwing, a migrant silver Y as well as the discovery of the distinctive larva of a puss moth on a small *Salix*, and a yellow-tail larva.

The Odonata species list comprised seven Anisoptera and three species of Zygoptera. A couple of southern hawkers were seen away from the ponds patrolling the glades. Both ruddy darters and a broad-bodied chasers were observed ovipositing in the Isle of Wight Pond. Other species recorded from this pond included a couple of emperor dragonflies, a brown hawker, a male black-tailed skimmer, common darter and emerald damselfly.

A variety of Orthoptera yielded speckled and dark bush-crickets, whilst an oak bush-cricket was beaten from foliage and Roesel's bush-cricket detected by ear. A nymph of a female short-winged conehead was found in the marginal vegetation by Isle of Wight Pond.

Amongst other insects found were several nymphs of the shieldbug *Troilus luridus*, aptly named; a male stag beetle with an 'antler' missing, and the larva of the tortoise beetle *Cassida viridis* on gipsywort.

### Grasshopper and bush-cricket Field Study Day, 11 August 2007

(Gavin Hawgood)

Twelve members duly met at Bookham station at 10.30 on a bright, sunny morning. I had to advise the group that, as Ian Menzies, the Study Day leader, was unfortunately unable to attend at the last minute due to illness in the family, he had asked me to take charge for the day.

The proceedings began well with evidence of the continuing presence on the Common after an absence of ninety years of rufous grasshopper *Gomphocerippus rufus*. Two males were found on Central Plain in the same area as new findings had been made during the 2005 and 2006 Study Days. Although no female examples were found, on the evidence of these searches, it is felt that a small colony has now established itself here and will probably continue to expand at a reasonable rate year on year, subject to the recently restored habitat (low scrub grass etc.) remaining suitable. It will be interesting to gauge the strength of this welcome recolonization over time.

As on previous recent study days, Central Plain also produced good numbers of the more common orthopterans such as meadow grasshopper *Chorthippus parallelus*, and common field grasshopper *C. brunneus*, as well as long-winged cone-head (including nymphs) *Conocephalus discolor*, and dark bush-cricket *Pholidoptera griseoaptera*. Surprisingly, in spite of fairly extensive beating, no examples of oak bush-cricket *Meconema thalassinum*, were found on this occasion, with only a handful of speckled bush-cricket *Leptophyes punctatissima* being seen in the more densely brambled area. There was also a rather disconcerting lack of stridulation from Roesel's bush-cricket *Metrioptera roeselii*, normally the most vociferous of the commoner orthopterans. The unseasonably low temperature (18° Celsius) and somewhat overcast late-morning sky may have been the main cause for this absence.

Again, although no examples of common green grasshopper *Omocestus viridulus* were encountered on Central Plain itself, a small number were heard stridulating along the Isle of Wight ditch en route to the IoW Pond itself. It should be noted that the common green grasshopper shares a superficially similar stridulation to that of the woodland grasshopper *Omocestus rufipes*. Although the latter has only been found on one or two occasions in the immediate past, it is understood that a small *rufipes* colony existed on Western Plain until fairly recently. It may be therefore that this species is being overlooked in favour of the more common *viridulus*, something that needs to be borne in mind during further surveys.

The Isle of Wight Pond produced an encouraging find in the form of a small, but fairly dense colony of short-winged cone-head *Conocephalus dorsalis* at the water's edge. This success may be due to the fact that the marsh area between the Pond and boardwalk was much wetter on this occasion than had been the case the previous month on the Dragonfly Study Day, when no definite examples of this species were found in spite of a relatively extensive search. Again, as with the rufous grasshopper rediscovery, this find would appear further to confirm the return to this area of *dorsalis* which was first noted in 2005 after an apparent absence from the Common of at least eight years. The general question arises as to whether the once fairly common *dorsalis*, which it is known generally favours a damper habitat and which will therefore always be somewhat restricted in number, has been steadily eased out in recent years by the less 'habitat-choosy', rapidly expanding *discolor* through so-called competitive exclusion.

The encouraging news on the *Gomphocerippus rufus* and *Conocephalus dorsalis* front was regrettably not the case on this occasion for lesser marsh grasshopper *Chorthippus albomarginatus*, of which there was, perhaps surprisingly, no sign at all here, or anywhere else on the Common. This in spite of several specimens having been found in this same area in 2005, the first known *albomarginatus* records ever for Bookham.

Weather permitting, it has become the custom in recent times for those interested in studying species not found at Bookham to continue on by car in the afternoon to Wisley and Fairmile Commons, where at least a further four species can normally be found. This year was no exception and the favourably clement weather duly offered the group very rewarding sightings of bog bush-cricket *Metrioptera brachyptera*, as well as the more elusive, but locally common, wood cricket *Nemobius sylvestris* at Wisley, and mottled grasshopper *Myrmeleotettix maculatus*, and stripe-winged grasshopper *Stenobothrus lineatus*, accompanying the more common short-horn species at Fairmile.

Several excellent digital photographs were taken of, amongst others, wood cricket and rufous grasshopper and subsequently posted to the Yahoo LNHS Invertebrates members file as a fitting visual record of the day's orthopteran findings. Eleven Bookham species (fifteen for the day) proved a welcome total. More importantly, however, as can be seen, the last few Study Days have thrown up some very encouraging new developments at Bookham, and it is hoped that this will form the basis of further concentrated study over the next few years.

## Additional field notes

(Stuart Cole)

The following notes on Coleoptera and Heteroptera were made on Bookham Common survey Saturdays in company with Ian Menzies:

**13.i.2007.** During this mild winter a fair number of beetles and other insects were encountered by beating ivy on the trunks of mature oaks in the woodland interior. The species included the following beetles: cream-spot ladybird *Calvia 14-guttata*, orange ladybird *Halyzia 16-guttata*, pine ladybird *Exochomus 4-pustulatus*, the tiny mould-feeding coccinellid *Clitostethus arcuatus,* and *Ptinomorphus imperialis* of the Anobiidae. The orange ladybird was formerly described as scarce and local (Majerus and Kearns 1989) but is now common in the London area while *Clitostethus* was found for the first time at Bookham in 1992. Amongst bugs beaten from ivy and holly were *Gonocerus acuteangulus*, a species once confined to the vicinity of Box Hill but now more widespread in our area, juniper shieldbug *Cyphostethus tristriatus*, another insect that has in recent years become more widespread and common, and *Troilus luridus*.

**10.iii.2007.** The weevils *Sitona lineatus* and *S. regensteinensis* were beaten from gorse along with many of the coccinellid *Rhyzobius litura,* and from honeysuckle *Calvia 14-guttata*. The elaterid *Melanotus villosus* was found under a log and *Cerylon histeroides* on fungus beneath loose bark.

**14.iv.2007.** The weevil *Liophloeus tessulatus* was beaten from ivy in some numbers.

**12.v.2007.** On a sunny day, both species of cardinal beetle *Pyrochroa serraticornis* and *P. coccinea* were commonly encountered on logs and low vegetation. The flea beetle *Crepidodera nitidula* (notable B) was taken on aspen while two other species of the genus, *C. aurata* and *C. plutus,* and the leaf beetle *Lochmaea capreae* were on sallow.

**14.vii.2007.** Two of the carabid beetle *Platynus assimilis* were beaten from poplar. About ten females of the beetle *Lymexylon navale* were found on the cut end of the bole of a recently felled oak by the Tunnel Car Park. Some were ovipositing, inserting their ovipositors into the narrow cracks of the wood face. This was a first record of this species for Bookham. At the same time about a dozen of the beetle *Platypus cylindrus* were active on the same log. This species is related to the bark beetles but is in a separate family, Platypodidae, of which it the sole representative in Britain. As both these beetles are uncommon, the log was saved from destruction and moved, along with some other oak logs, by The National Trust to a spot near Merritt's Cottage. This log pile produced a number of other beetles including *Uleiota planata,* a once-rare species that has become quite common around London recently, *Scydmaenus rufus,* and larvae of the longhorn *Rhagium mordax*. Shortly after this date Ian Menzies beat two specimens of the handsome silphid beetle *Dendroxena quadripunctata* (Notable B) from the foliage of an oak tree. This was the first record of this species at Bookham since the 1940s. Although belonging to the carrion beetle family, *Dendroxena* preys on caterpillars.

**8.ix.2007.** The little dark blue weevil *Involvulus caeruleus* was beaten from a crab apple tree.

**13.x.2007.** Among other beetles found were the leaf beetles *Chrysolina polita* on comfrey in woodland, *Pyrrhalta viburni* on guelder rose, and the staphylinid *Sunius propinquus* on hawthorn.

Finally, Gay Carr sent me a note about a field trip to Bookham Common on 29 August 2007 led by Butterfly Conservation. It was specifically to confirm the continuing presence there of the brown hairstreak *Thecla betulae*, a local and declining butterfly in Britain and elsewhere in Europe. In this the trip was successful in locating two females of *T. betulae*, one in the act of ovipositing on blackthorn.

### Reference

MAJERUS, M. and KEARNS, P. 1989. *Ladybirds.* Naturalists' Handbooks 10. The Richmond Publishing Company.

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# Book review

***Garden natural history.*** Stefan Buczacki. New Naturalist No. 102, Collins, London. 2007. 324 pp. Hardback, £40, ISBN 978 0 00 713993 4; paperback, £25, ISBN 978 0 00 713994 1.

The London Natural History Society area, a 20-mile (32-km) circle centred on St Paul's Cathedral, has the greatest single area of garden habitat of the UK. Every LNHS member would enjoy becoming familiar with the book's main conclusions. Its production and style of writing are first rate, and my negatives are trifling. For example, the editors' strange habit of omitting its number in the New Naturalist series from the paperback version persists, and the information is to be found only on the wrapper of the hardback. Why not include it on the title page? But it is an excellent book.

There is a huge paradox about gardens and naturalists. Whereas early naturalists and many of the greatest since have been inspired by and produced great works from studies of aspects of their garden biota, little attention has been paid specifically by naturalists to gardens as a habitat. True, gardens are implicitly at least partly artificial, and certainly daunting in their diversity. Yet they harbour innumerable species. It is a wise naturalist indeed who knows all the species in his garden of any group of animals or plants save perhaps the vertebrates. Buczacki himself states (p. ix) 'I had not reckoned on how tiny, disparate and perfunctory was the scientific literature, how sparse the studies of garden wildlife. Apart from birds, almost no group of organisms that lives in gardens has been studied in relation to this particular habitat in any depth.'

The very word 'garden' is a catch-all phrase. Gardens range from the great estates artisically landscaped by Lancelot ('Capability') Brown (1716–1783) in the eighteenth century which gave much of our southern English countryside its scenery; through closely regulated gardens such as the great horticultural collections; to our own backyards. These last, despite their small size compared with the vast wild places we love, nevertheless fascinate all of us who takes a hand-lens to them in their rich and beautiful diversity of life-forms. The humble autumn worm-casts on my lawn, the larger the better, are a great delight to me (though not to my wife, but that is another story!). Charles Darwin (1809–1882), without doubt Greater London's most accomplished naturalist, thought worm-casts worthy of his study in his famous garden now drawn into the London Borough of Bromley, and his last book was entirely about them. Another great read, if you have not had that pleasure already.

Stefan Buczacki's book is, then, a trailblazer. Many of its sections on one aspect or another are necessarily brief, commendably so since the author refrains from extrapolating where there are no data; but these very ~~few~~ sections provide, in their diversity, numerous signposts to topics that deserve study. In that sense in places it is an overview, and a masterly one.

The major chapters include the history of British gardens; the impact of gardens on the natural environment; their role in the British landscape; adapting to gardens by native plants and vertebrates; aliens in gardens and as escapes from them; smaller life-forms in gardens; gardens in conservation; gardens inspiring naturalists; gardens as educational facilities; and the future of gardens in our natural history.

There is much to be found in the detail. Britain has more gardens today per capitata than anywhere else (pp. 24–25), with 15–20 million private gardens and as many lawns. Our gardens cover an area equivalent to that of Somerset. Only two British National Parks are bigger. Sheffield, Professor Buczacki quotes, has 175,000 gardens with 25,000 ponds, 50,000 compost heaps, 360,000 trees and 45,000 nest-boxes. I learnt that to have a leaky pond is an offence (guilty!). Changes in permitted garden insecticides have proved beneficial to insect fauna, especially to some bees. I was surprised, however, to see repeated the simplistic and perilous theory that the number of tree species in thirty metres of hedgerow roughly indicates its age in centuries. This surely is piffle, though I know many Kent tree-wardens, for example, unwisely cling to it. The idea is, if I may say, hedged by so many fallacies as to be misleading. Conifers in gardens get just two pages of text; and, surely another major omission, soil is barely mentioned. One might forgive this last, however, for soil is a huge subject and has already had two New Naturalist volumes of its own.

It is a great book on a subject difficult to pull together. Buy it quickly, before it becomes one of those rare New Naturalists that you can no longer afford!

Paul F. S. Cornelius

# Blooms of algae on Hampstead Heath in 2007

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April 2007 was the hottest since records began in 1659, with a Central England Temperature (CET, an area roughly covering a triangle between London, Bristol and Lancashire) of 11.2°C (52.2°F). The previous record, set in 1865, was 10.6°C (52°F).

Hawthorn was flowering in early April (and in some areas had been in flower since March) and swifts arrived early from Africa (*The Daily Telegraph,* 28 April 2007).

The first algae blooms occurred in April, early for Hampstead. However the temptation to blame this on global warming should be resisted: Reynolds (1971) noted *Aphanizomenon flos-aquae* (Linnaeus) Ralfs from North Shropshire as early as March in 1967 (CET 7.0°C), April in 1968 (CET 8.1°C) and always present by May.

Towards the end of April a scum of *Oedogonium* formed on Whitestone Pond (TQ262 863) (first noticed 29 April) and had dispersed by 5 May. It was during the first week of May that a bloom of *Anabaena flos-aquae* (Lyngbe) de Brébisson began on Hampstead No. 2 pond. On 5 May it was already occupying about 30–50 cm of the pond margin and expanded into the pond before dying back in a few weeks.

May was notable for its wet weather and was followed by a more miserable June and a July which was the wettest since records began, bringing floods to large parts of the country. The lack of sunshine inhibited algal growth and the first bloom of summer was of *Aphanizomenon flos-aquae* on the Model Boating Pond (TQ 278 867), first noted on 16 July and later washed into the Men's Bathing Pond Highgate (TQ 278 865) by the heavy rains. It remained there for a fortnight; meanwhile, the Model Boating Pond became dominated by *Oscillatoria subbrevis* Schmidle.

A bloom of *Cladophora glomerata* (Linnaeus) Kützing appeared on Hampstead Number 2 Pond (TQ 273 861) on 24 July and was dispersed within a couple of days by strong winds. At the end of August, the Leg of Mutton Pond (TQ 254 867) was dominated by *Mallomonas caudata* Ivanoff emend. Willi Krieger.

The next bloom to be reported was *Aphanizomenon gracile* C. Morren and *Anabaena flos-aquae*, again at Men's Bathing Pond Highgate (TQ 278 865) at the beginning of November. It was still there on the 10 November, but faded soon afterwards.

The year 2007 was notable for the paucity of algal blooms, remarkable considering that the ponds on the Heath are at least eutrophic and should be fertile breeding grounds (Anderson 1995). This may be because of the weather, or the Corporation of London's efforts to eradicate algal blooms from the ponds, or a combination of both.

## References

ANDERSON, N. J. 1995. Naturally eutrophic lakes: reality, myth or myopia? *Trends in ecology and evolution.* **10**: 137–138.

REYNOLDS, C. S. 1971. The ecology of the planktonic blue-green algae in the North Shropshire meres, England. *Fld Stud.* **3**: 409–432.

# Book review

***The moths of Hertfordshire.*** Colin W. Plant. Hertfordshire Natural History Society. 2008. A4 hardback, 542 pp. £45. ISBN: 978 0 9521685 7 7.

The sub-title is ***The history, status, distribution and phenology of the micro- and macro-lepidoptera of a south-eastern English county***. After fifty pages of introductory material, there are accounts of the 1,548 species (62 per cent of the British list) recorded in the Watsonian vice-county between 1710 and 2006. For each species, the dates of its first and last records, its conservation status in Hertfordshire, the caterpillar's food plants and the adult's flight period are followed by details of its collection history and ecology in the county, with notes where relevant on taxonomy and allied species, and on occurrence elsewhere in Britain. Distribution maps show every localized record in three easily-distinguishable date classes (pre-1950, 1950–1994, 1995–2006), while bar charts show the weeks throughout the year in which the more frequently observed moths (about one third of the species) were recorded flying. The book ends with recommendations for categorizing species for Hertfordshire's Biodiversity Action Plan, notes on 'Some Hertfordshire Moth-ers' (all but two, actually, male), advice on collecting moths, some not-so-serious literary references to moths, and a list of the Latin and English names of all the food plants mentioned.

Colin Plant, natural historian, entomologist, Moths Recorder for Hertfordshire and for the London Natural History Society, and past president of the London Natural History Society, has followed his books about London's butterflies and larger moths with another *tour de force*. This sumptuous work, profusely illustrated in full colour throughout, will appeal to a wide readership including non-entomologists such as myself. No doubt the experts will subject it to their judicious and critical appraisals, but to me it seems to set a standard to which all regional treatments of natural history should aspire but few can hope to reach. The distribution maps, taken in conjunction with an interesting contribution by I. P. Woiwod and P. J. L. Gould on long-term moth studies at Rothamsted, are of great value in relating the records to land use and vegetation. The information on phenology contained in the histograms of flight dates is of a quality perhaps unrivalled in Britain. Taken together, these data constitute an invaluable baseline for future workers trying to interpret changes in the moth fauna. Some of these changes are extremely rapid — see, for example, the account of the horse-chestnut leaf miner *Cameraria ohridella*, first recorded in Herts in November 2003 and now 'likely to be present in large numbers on every horse-chestnut tree in the county'. Species that have declined or become extinct (or overlooked) in recent years include once-common moths such as the small eggar *Eriogaster lanestris* and the lappet *Gastropacha quercifolia*. Some of these losses are attributed to the use of pesticides and the grubbing-up (or machine flailing) of hedgerows; others are more mysterious.

It must be emphasized that this is not a field guide — at more than 3 kg it will rarely be carried outdoors! Apart from a sketch distinguishing the antennae of spruce carpet *Thera britannica* from those of grey pine carpet *T. obeliscata*, there is rather little on identification, which in many cases requires critical examination, including dissection of the genitalia, and close attention to the food plants. This is the case, for instance, with the pugs. Colin has been ruthless in rejecting records for this group which do not satisfy his own high standards for identification to species level. His commentaries on five-spot burnet *Zygaena trifolii* and its close relative narrow-bordered five-spot burnet *Z. lonicerae* provide another example of the author's concern for the validity of records, and the difficulties even experts face in distinguishing similar species.

The beginner may be disappointed by the lack of scale bars on the photographs of moths scattered through the text, showing all species at similar apparent sizes. But the advice on collecting is impeccable. Water carpet *Lampropteryx suffumata* frequents blackthorn bushes, where it can be captured. Colin advises that if 'after setting the trap you are not scratched and bleeding, then you have not put the trap far enough in and you may not catch any'. There speaks a lifetime of experience.

The author acknowledges the hard work and enthusiasm of his predecessors among the students of Hertfordshire moths, and of members of the Herts Moth Group who are generously mentioned in the species accounts and elsewhere. Nevertheless this is Colin's book — and indeed it is ours, since about one third of Hertfordshire lies within the LNHS recording area. What happens in Hertfordshire is of interest and concern to London, and for this reason the LNHS is pleased to appear amongst the sponsors of this publication. Its comprehensiveness, accuracy and attention to detail will commend it to lepidopterists for years to come.

JOHN EDGINGTON

# Botany report for 2007

MARK SPENCER

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## Introduction

This is now my first full year since taking over from Rodney Burton. He is a hard act to follow, and I wish to express my personal gratitude for his kindness and expertise. I have succumbed to temptation and have decided to try a new format for the annual botany report; hopefully, members will approve of it. Please let me know what you think.

The LNHS Botany Committee and I have decided that the time has come to start planning for an update of Rodney's *Flora of the London Area*. Since its publication in 1983, the plant life of Greater London and the surrounding region has changed massively, the abundance of many non-native plants has increased, whereas many of our rarer native species continue declining or have become extinct. We also feel that the areas outside the current boundaries of Greater London are generally well served by floras that are either in production or have been produced relatively recently. Additionally, the rate and form of change in these areas appears to have been rather different from that currently taking place within Greater London. Therefore we have decided to restrict the proposed *Flora* to the Greater London area and the small area of the vice-county of Middlesex that falls outside the Greater London Authority boundary. Over the next year or two we will be developing ideas for how to proceed with this project. Please do contact me (72 Michael Cliffe House, Skinner Street, London EC1R 0WX; Tel.: (+44) 020-7837 1471; e-mail: Lnhs_plant_recorder@hotmail.co.uk) or the Botany Committee if you would like to participate.

The changes in our non-native flora have been apparent to many and a large proportion of the records presented in 2007 is from this group of plants; the other main group is findings of rare native plants. David Bevan reported a long list of records from Coldfall Wood, Haringey (Middlesex, vc 21: TQ276902) for 2007 following coppicing work as part of the 'Capital Woodlands Project' funded by the Heritage Lottery Fund. I will not steal David's thunder by reporting his findings in detail but I would like to highlight a few interesting records. Various non-natives were reported, some probably from nearby gardens, such as *Alchemilla mollis* **lady's-mantle** and *Verbena bonariensis* **Argentinian vervain**. The latter I thought would have become more widespread in recent years following the massive 'voguish' usage of this plant by horticulturists over the last fifteen years or so. As yet, it does not appear to have made more of an impact: Please do report any sightings of this, I may yet be proved right! Other non-natives appear to have entered the wood via birds (I am guessing), such as *Duchesnea indica* **yellow-flowered strawberry** and *Leycesteria formosa* **Himalayan honeysuckle.** The former seems to be increasing substantially recently, with reports from various parts of Greater London. The appearance of *Solanum esculentum* **tomato** and *Actinidia chinensis* **Chinese gooseberry** is probably attributable to some unreliable plumbing within the area! The *Actinidia* record, found by Nick Bertrand, David and myself on 3 October, may be a British first.

Very satisfyingly for David, the coppicing has enabled the germination of various native species lying dormant within the seed bank. *Carex pilulifera* **pill sedge,** in its only known site in Haringey and only one of a very few remaining in Middlesex, has made a reappearance, as did *Hypericum pulchrum* **slender St John's-wort** and *Isolepis setacea* **bristle club-rush**. On the same day that the Chinese gooseberry revealed itself, Nick Bertrand spotted a lone seedling of *Rumex pulcher* **fiddle dock**; hopefully this will make it to maturity. The only other extant site I can readily recall in Middlesex is the one in Kensington Gardens (TQ273803).

Consistent ecological studies and monitoring are often lacking in urban areas, so it is good to hear that some workers are committed to these important activities. Leslie Williams reported to me the results of monitoring by Barn Hill Conservation Group in 2006 of meadows at Fryent Country Park. He informed me that over 200 species that have been recorded in the meadows since 1985 and the records maintained on an Access database. Leslie noted that *Arrenatherum elatius* **false oat-grass** continues to be dominant; an indication of a turbulent, poorly managed past? Thankfully, *Bromus commutatus* var. *commutatus* **meadow brome** and *Bromus racemosus* **smooth brome** are recovering from low counts in 2002, whereas the nationally common *Bromus hordeaceus* ssp. *hordeaceus* **soft brome** is strangely scarce. Worryingly, *Ranunculus acris* **meadow buttercup** and *R. repens* **creeping buttercup** appeared to be decreasing, possibly, Leslie thinks, due to the recent dry summers. However, *Vicia hirsuta* **hairy tare** and *Vicia sativa* **common vetch** showed increases. These observations may lend themselves to many conclusions, but it is necessary to remain cautious. What is certainly true is that we are in desperate need of methodical, consistent and scientifically rigorous studies monitoring changes in Greater London's flora (both native and non-native) during these rapidly changing times. Wherever possible, I do believe it is important to ensure that records gathered are deposited elsewhere, for safe keeping and to enable the widest access possible to the information gathered. I strongly support London's local biological records centre, Greenspace Information for Greater London (GiGL — http://www.gigl.org.uk/) and encourage people to deposit large blocks of data with them. I am more able to deal with specific records or small blocks of data; GiGL have the resources to deal with far greater volumes of data than one person can easily process.

## FLOWERING PLANTS — arranged alphabetically by family

### Aceraceae

David Bevan found two *Acer saccharoides* **silver maple** seedlings beneath parent trees in Bounds Green Road, Haringey (Middlesex, vc 21: TQ3190).

### Alismataceae

Rodney Burton told me that David Bevan informed him of the reappearance of *Baldellia ranunculoides* **lesser water-plantain** at Glebelands Local Nature Reserve, Barnet (Middlesex, vc 21: TQ268935) in its only known Middlesex site.

### Apiaceae

Eight plants of *Ammi majus* **bullwort** were found by Mark Gallant on 4 June in a 'disturbed flower bed located next to Bow Locks' (Middlesex, vc 21: TQ383825), and he suggested that they 'maybe relic from the waterways industry past and the importation of wool'. I am uncertain of their origin, although Rodney Burton thought they might have arrived as birdseed contaminants.

A single plant of *Apium graveolens* **wild celery** was found by the London Wildlife Trust habitat survey team on 28 June by the side of the River Effra in Brockwell Park, Lambeth (Surrey, vc 17: TQ314741). On 15 July, I visited the now well-known site for *Apium repens* **creeping marshwort** on Walthamstow Marshes (S. Essex, vc 18: TQ352875), alongside which was growing *Samolus valerandi* **brookweed** and *Veronica catenata* **pink water-speedwell**.

A few plants of *Coriandrum sativum* **coriander** were found, by Elinor Wiltshire, in early June by the Round Pond, Kensington Gardens (Middlesex, vc 21: TQ264802). These plants most probably arrived via birdseed.

A walk lead by Pippa Hyde for the LNHS and Friends of Bushy and Home Parks on 28 July around the Boating Lake, Heron, and Leg of Mutton Ponds (Middlesex, vc 21: TQ1669), produced a long list of sightings which unfortunately included the invasive *Hydrocotyle ranunculoides* **floating pennywort**.

The discovery of a non-native species of *Oenanthe javanica* **water-dropwort** was reported to me by David Bevan late in 2007, growing in the refashioned Sutcliffe Park, Eltham Road, Greenwich (W. Kent, vc 16: TQ409747). This species, and *Cyperus eragrostis* **pale galingale**, have appeared since the Environment Agency completed its Flood Alleviation Scheme. Presumably these plants arrived via container-grown material that was imported when planting up the site. Incidentally, there is a report of the North American *Carex greyii* from nearby on the River Quaggy, although I do not have precise location details. Serious efforts should be made to remove all of these species as they may become invasive. The native *Oenanthe fluviatalis* **river water-dropwort** was found, alongside *Sparganium emersum* **unbranched bur-reed**, by the London Wildlife Trust habitat survey team to be plentiful in the upper reaches of the New River, Enfield (Middlesex, vc 21: TQ318938). This is in contrast to lower down the New River, in Haringey, where I have searched in vain for it, although the *Sparganium* is present.

*Sison amomum* **stone-parsley** was found by Aaron Woods and Roy Maycock at Burtonhole Lane, Mill Hill (Middlesex, vc 21: TQ239928) on 11 March. It was also found by Ian Kitching on 26 June on the east side of Mile End Park, north of Haverford Road, Mile End, Tower Hamlets (Middlesex, vc 21: TQ360829).

*Smyrnium olusatrum* **alexanders** was found by Ian Kitching on 9 April beside a path in centre of Tower Hamlets Cemetery Park, Mile End, Tower Hamlets (Middlesex, vc 21: TQ369823). Mr R. Groom also reported this from the edge of the River Pinn, Eastcote Village (TQ111891) confirming an earlier report. It is interesting to get repeat records for plants like this which are still rather scarce in the London area. On 16 April, John Edgington recorded a large colony of this plant growing on the Regent's Canal towpath at York Way, Camden (Middlesex, vc 21: TQ302835) which he had first noticed the previous year. This colony has been known to me since 2002 and may have originated from the nearby London Wildlife Trust site at Camley Street where it was formerly grown. Ian Woodward found it on 21 February at Larkswood, Larkswood Road, Waltham Forest (S. Essex, vc 18: TQ383925) and reported that it came into flower on 24 March.

### Araceae

*Arum italicum* ssp. *italicum* **Italian lords-and ladies** was found by Ian Kitching on 7 April beside a path in the centre of Tower Hamlets Cemetery Park, Mile End, Tower Hamlets (Middlesex, vc 21: TQ368822).

### Araliaceae

John Edgington reported finding *Fatsia japonica* **fatsia** as a casual by the towpath at St Pancras Lock, Camden (Middlesex, vc 21: TQ298836) on 11 February. I have noticed the same plant and I suspect it may be planted. In a stairwell on the west side of Huntley Street, Camden (Middlesex, vc 21: TQ295819) I found a seedling of *F. japonica* in late December.

### Asteraceae

Several plants of *Ambrosia artemisiifolia* **ragweed**, probably originating from bird seed, were found by Ian Kitching on 17 August in gardens by the right bank of the River Wandle, Merton High Street, Collier's Wood, Merton (Surrey, vc 17: TQ266701).

*Anthemis austriaca* **Austrian chamomile** has found its way into many so-called 'wildflower' seed mixes of late and is causing much confusion to those not familiar with it. Plants keying out as *Anthemis arvensis* **corn chamomile** should be checked carefully, especially where habitat creation schemes have been undertaken; the presence of *Centaurea cyanus* **cornflower**, *Glebionis* (formerly *Chrysanthemum*) *segetum* **corn marigold** and *Agrostemma githago* **corncockle** should be warning enough. I found *A. austriaca* in such a 'wildflower meadow' sown in Spa Fields, Skinner Street, Islington (Middlesex, vc 21: TQ314824) during the summer.

*Buphthalmum salicifolia* **yellow oxeye daisy** was found by Ian Kitching on 7 April beside a pond in Mile End Ecological Park, Mile End Park, north of Haverfield Road, Mile End, Tower Hamlets (Middlesex, vc 21: TQ359830); although *B. salicifolia* was planted nearby, this plant may have regenerated naturally.

*Cirsium dissectum* **meadow thistle** was found at Firs Farm Wood, Enfield (Middlesex, vc 21: TQ324928) by the London Wildlife Trust habitat survey team on 18 September, along with *Convallaria majalis* **lily-of-the-valley**, *Hypericum androsaemum* **tutsan**, *Athyrium filix-femina* **lady fern** and *Carex silvatica* **wood-sedge**.

I found *Echinops bannaticus* **blue globe-thistle** in Brentham Meadow, Brent River Park (Middlesex, vc 21: TQ174826) on 27 September. The plant was growing near the A40 and probably originated as a garden throw-out.

John Edgington reported finding large quantities of *Filago vulgaris* **common cudweed** on the gravel surface of a flood-defence berm, opposite Duck Lane at the entrance to Wintry Wood, Epping (S. Essex, vc 18: TL473043) on 1 September. This plant may be making a bit of a recovery in the London area in recent years; another substantial colony was reported by Claire O'Reilly near Victoria Gate, Hyde Park (Middlesex, vc 21: TQ266805).

Outside of its strongholds along the Thames to the east of London, *Senecio inaequidens* **narrow-leaved ragwort** continues its gradual expansion. One plant was found by Ian Kitching on 3 June in gardens by the right bank of the River Wandle, Merton High Street, Collier's Wood, Merton (Surrey, vc 17: TQ265701). Pippa Hyde reported to Rodney Burton that large quantities of *S. inaequidens* were to be found growing as a weed in flower beds near Collier's Wood station (Surrey, vc 17: TQ267703). Nick Bertrand found a single plant in a park flower bed south of Waterloo, Lambeth (Surrey, vc 17: TQ307790). It was observed again by Ian Kitching on 6 June beside platform 4 of Elmers End station, Bromley (W. Kent, vc 16: TQ357683). Also in Kent, Geoffrey Kitchener recorded a single plant, on 1 September, from the central reservation of the M25 near Hawley (W. Kent, vc 16: TQ5571). I found several plants on a small wasteland site near the River Lea (S. Essex, vc 18: TQ374855) on 25 April. The site has since been engulfed by the 2012 Olympics development but doubtless it will persist in the area.

Mary Smith reported that, on 10 July, Bob Creber found *Sonchus tenerrimus*, south of Romford, in Bancroft Chase, off Upper Rainham Road, Havering (S. Essex, vc 18: TQ517867) as a possible birdseed alien growing in a shrubbery. This is a plant of the Mediterranean region, with one other recent record from SE England post 2000 (BSBI Maps Scheme: http://www.bsbi.org.uk/html/atlas.html).

Two plants of *Telekia speciosa* **yellow oxeye**, possibly planted, were found by John Edgington, by the river stairs in a small untended shrubbery at the west end of Upper Mall, Hammersmith (Middlesex, vc 21:TQ222782) on 10 October.

### Balsaminaceae

Roy Vickery found approximately thirty plants of *Impatiens balfourii* **Kashmir balsam** on 12 November on a small patch of waste ground in Chestnut Grove, Balham, Wandsworth (Surrey, vc 17: TQ2873). The joint LNHS and Friends of Bushy and Home Parks walk on 28 July around the Boating Lake, Heron, and Leg of Mutton Ponds (Middlesex, vc 21: TQ1669) recorded *Impatiens capensis* **orange balsam**.

### Berberidaceae

I have few records of *Mahonia* species. *Mahonia aquifolium* **Oregon-grape** was recorded by John Palmer from Hextable (W. Kent, vc 16: TQ5170) on 13 September. Ian Woodward sent a record from Larkswood, Larkswood Road, Waltham Forest (S. Essex, vc 18: TQ383925) of a plant he found on 22 February, although he did not record which species he had found. Many such popular garden plants that subsequently escape or are thrown out are under recorded and I would appreciate more information on these. In this vein, Ian also recorded an unknown *Philadelphus* **mock-orange** and *Symphoricarpus* × *chenaultii* **pink snowberry** from Larkswood.

### Boraginaceae

*Anchusa arvensis* **bugloss** was found by Ian Kitching on 22 April on a disturbed roadside verge at the corner of Ampere Way and Beddington Farm Road, Beddington, Sutton (Surrey, vc 17:TQ302668).

As reported in *BSBI News* **107**: 31, *Lappula squarrosa* **bur forget-me-not** was found by the River Mole, Leatherhead (Surrey, vc 17: TQ162562) and in Beddington Park, Wallington (Surrey, vc 17: TQ295655) by Denis Skinner and Rosy Jones in August.

### Brassicaceae

*Barbarea verna* **American winter-cress** was found by Ian Kitching on 22 April on the north side of Coombe Lane along the south edge of Lloyd Park, Croydon (Surrey, vc 17:TQ341644).

A single plant of the now rather rare *Camelina sativa* **gold-of-pleasure** was found by Geoffrey Kitchener on 29 May on Mornington Crescent, Camden (Middlesex, vc 21:TQ2983).

*Eruca vesicaria* ssp. *sativa* **garden rocket** was found by Ian Kitching on 12 May on the east side of Kimpton Park Way just north-west of the junction with Kimpton Road, North Cheam, Sutton (Surrey, vc 17:TQ248659).

A single plant of *Erucastrum gallicum* **hairy rocket** was found by the London Wildlife Trust's habitat survey team on 10 July in rough ground on Peabody Hill, Lambeth (Surrey, vc 17:TQ320735).

*Rapistrum rugosum* ssp. *linnaeaceum* **bastard cabbage** was found by Ian Kitching on 12 May on the east side of Kimpton Park Way, north-west of the junction with Kimpton Road, North Cheam, Sutton (Surrey, vc 17: TQ246659). The same species was found by Ian on 4 August at the entrance to Thames Down Link on the west side of Moor Lane, Chessington, Kingston upon Thames (Surrey, vc 17: TQ192639).

One plant of *Sinapis alba* ssp. *alba* **white mustard** was found by Ian Kitching on 7 July in a garden on Grand Drive, West Barnes, Merton (Surrey, vc 17:TQ233680).

*Sisymbrium irio* **London rocket** seems be spreading recently. John Edgington reported numerous plants from the wall of the Royal Mail car park, Gough St, Holborn (Middlesex, vc 21: TQ309822) on 26 March and from the junction of Pentonville Road and Penton Street, Islington (Middlesex, vc 21: TQ310831) on 7 May. I suspect these plants may be a continuation of the population I found in Clerkenwell a couple of years previously. Interestingly, the Islington plants have a different flower colour from those found further east in Tower Hamlets and Hackney and I suspect they may have an independent origin. Aaron Woods reported that the population known from the Warren Street (Middlesex, vc 21: TQ290821) area was still extant on 7 August. I have not got round to seeing these plants but it would be interesting to discover which of the other populations they resemble. On 25 April I found several dozen plants by the Regent's Canal on the towpath wall near Dunston Road, Hackney (Middlesex, vc 21: TQ337837). These plants were comparable to those further east in Tower Hamlets.

### Caprifoliaceae

Graham Medcalf asked Rodney Burton to pass on his record of *Sambucus ebulus* **danewort** from the edge of the A217 at junction 8 of the M25 (Surrey, vc 17: TQ258527).

As I have mentioned previously while discussing *Mahonia*, escapes from horticulture often go under-recorded. Geoffrey Kitchener recorded *Viburnum tinus* **laurustinus** from Kemsing, north of the Pilgrims Way (W. Kent, vc 16: TQ5558) on 2 April. This species is widely planted and often escapes, yet records are sparse.

### Caryophyllaceae

Geoffrey Kitchener found *Cerastium diffusum* **sea mouse-ear** on 6 May at Bessels Green (W. Kent, vc 16: TQ5055) growing along the centre reservation and road margins of the A25.

On 18 April, Rodney Burton discovered *Minuartia hybrida* **fine-leaved sandwort** 'densely massed along about four metres of old wall' south of the Baptist church, Eynsford (W. Kent, vc 16: TQ542657). This colony is about 100 metres from the one on the ruins of Eynsford Castle first found by Rodney in 1994.

The London Wildlife Trust's habitat survey team reported a small colony of *Spergularia marina* **lesser sea spurrey** on the verge of the Great Cambridge Road (A10), Enfield (Middlesex, vc. 21: TQ339951) on 1 September. Earlier in the year, on 4 June, the same team found *Spergularia rubra* **sand spurrey** at Trent Country Park, Enfield (Middlesex, vc. 21: TQ976288) growing on a sandy path through nutrient-poor grassland.

On the muddy bank of a shaded stream, *Stellaria alsine* **bog stitchwort**, growing alongside *Galium palustre* **marsh-bedstraw**, was found by the London Wildlife Trust's habitat survey team in Church Wood, Trent Country Park, Enfield (Middlesex, vc. 21: TQ283968) on 17 May.

### Chenopodiaceae

On 11 September, John Edgington discovered an extensive colony of *Atriplex* × *gustafssoniana* **Kattegat orache** (conf. John Akeroyd) on rough ground, named Grosvenor Meadowbank, beside the Thames at Chelsea Bridge, Kensington & Chelsea (Middlesex, vc. 21: TQ286779).

Emulating its behaviour in other parts of the country, a single plant of *Bassia scoparia* **summer-cypress** was found in the central reservation of the M25 near Dartford (W. Kent, vc 16: TQ5573) by Rodney Burton on 2 September.

Nearby, seven days later, Geoffrey Kitchener found it to be abundant on the central reservation of the same motorway (W. Kent, vc 16: TQ52665166). It will probably become much more frequent in the region within the near future.

*Chenopodium ambrosioides* **Mexican tea** was reported by Mark Gallant as still being extant in the Bow Locks area (Middlesex, vc 21: TQ3882), despite the best attempts of British Waterways contractors to annihilate all life with a strimmer! The much declined *Chenopodium murale* **nettle-leaved goosefoot** was noticed growing as a casual by John Edgington on 28 October in a pavement on Judd Street (Middlesex, vc 21: TQ301826). Aaron Woods also noted three plants in a garden, Hampstead Road, Camden (Middlesex, vc 21: TQ291831). It was also found on an LNHS Botany walk at London Zoo, Regent's Park (Middlesex, vc 21: TQ279836) on 6 May.

### Clusiaceae

*Hypericum hirsutum* **hairy St John's-wort** was found by Ian Kitching on 26 June beside a path in Tower Hamlets Cemetery Park, Mile End, Tower Hamlets (Middlesex, vc 21: TQ370823).

### Commelinaceae

*Tradescantia fluminensis* **wandering-jew** was found by Ian Kitching on 16 June beside a path in south-west corner of Tower Hamlets Cemetery Park, Mile End, Tower Hamlets (Middlesex, vc 21: TQ369822). John Edgington also found a patch growing from a crack in the pavement on Lloyd Baker Street, Islington (Middlesex, vc 21: TQ310826) on 7 May.

### Crassulaceae

I received two records for *Umbilicus rupestris* **navelwort** this year, both in December. The first record, on 10 December, came from Rodney Burton and gave detailed information on a colony growing on a wall in Sparepenny Lane, Farningham (W. Kent, vc 16: TQ543670) where it was first seen by John Palmer and Eric Philp on 1 January 1995. The second, on 29 December, was received from John Edgington, detailing another known site first found in 2000. John counted at least forty plants growing in mossy cracks between paving cobbles in front of an apartment block forming the east side of Munster Square (Middlesex, vc 21: TQ289824). Most are behind a fence line but a few are on the continuation of the cobbles onto the public pavement.

### Cyperaceae

Ian Kitching found *Carex disticha* **brown sedge** on 26 May at the west edge of Chertsey Meads, Runnymede (Surrey, vc 17: TQ062660). *Carex* × *subgracilis acuta* × *acutiformis* was reported by Ian Kitching on 26 May at the west edge of Chertsey Meads, Runnymede (Surrey, vc 17: TQ061661). As reported in *Surrey Botanical Society Newsletter* (No. 12, April 2008), George Hounsome and B. W. Phillips determined a large nearby colony (TQ063662) as this plant. A single, large clump of *Carex pseudocyperus* **cyperus sedge** was found by the London Wildlife Trust habitat survey team on 11 July at Beech Hill Lake, Enfield (Middlesex, vc 21: TQ272972).

*Cyperus eragrostis* **pale galingale** continues its inexorable spread along the Regent's Canal by London Zoo, Camden (Middlesex, vc 21: TQ2783 and TQ2883). This colony has been known for many years and as Aaron Woods reported, it is abundant there now. This plant is a seriously invasive species in warmer regions of the world and the recent increase in the size and number of populations should be of concern. On 10 August I found a large plant of *Cyperus involucratus* growing in the Grand Union Canal by the towpath opposite Kensal Green Cemetery (Middlesex, vc 21: TQ230823). Although probably originally planted, this plant was reproducing vigorously by offsets, several of which were rooting nearby.

### Dipsacaceae

Mr J. Rogers found *Dipsacus pilosus* **small teasel** at Mill Hill (Middlesex, vc 21: TQ222910); he later informed me that that it had been purposely introduced.

### Fabaceae

Nick Bertrand recorded a self-sown seedling of *Cercis siliquastrum* **Judas-tree** in a flower bed at Geraldine Mary Harmsworth Park, Lambeth (Surrey, vc 17: TQ315790).

A lone five-foot high sapling of *Gleditsia triacanthos* **honey-locust** was reported by David Bevan from Queen's Wood, Haringey whilst recording for the local Friends group. It was found near the well-known colony of *Aesculus indica* seedlings by the Lodge at the western entrance to the wood (Middlesex, vc 21: TQ300884). This will almost certainly be another first record for Middlesex but will require checking.

One of my favourite British plants, *Lathyrus aphaca* **yellow vetchling**, was found growing in scattered colonies in grassland above the Channel Tunnel rail-link at Springhead, Gravesend (W. Kent, vc 16: TQ 618729 to TQ617731) by Geoffrey Kitchener on 3 June. Another favorite, *Lathyrus nissolia* **grass vetchling** was found by Ian Kitching on 16 June in a grassy area between Cantrell Road and the railway arches, Mile End, Tower Hamlets (Middlesex, vc 21: TQ370821). *L. nissolia* was also found at Springhead alongside *L. aphaca* as well as large quantities of *Melilotus indicus* **small melilot**.

On 23 October I found a small fruiting plant of the non-native Mediterranean *Medicago orbicularis* growing in the same location as *Fumaria capreolata* ssp. *capreolata* on Margery Street, Islington (Middlesex, vc 21: TQ310825). This is a very distinctive plant and is unlikely to be confused with other small *Medicago* species. The presence of these two plants growing at the base of a moribund, imported (probably) date palm is a good example of how the mass transport of horticultural material can inadvertently help spread non-natives species; although many of these events are innocuous, the potential for harm is great.

*Ononis spinosa* **spiny restharrow** was reported by John Edgington from Wintry Wood, Epping (S. Essex, vc 18: TL473043) on 1 September.

The laburnum-like shrub *Piptanthus tomentosus* was reported by John Edgington on 17 June from open ground near St Paul's Church, Shadwell (Middlesex, vc 21: TQ352806). He states that it is 'possibly planted but a curious choice as this is not ornamental ground'. He also observed a lack of developing fruit and suggested the plant may be a hybrid.

About ten plants of *Trifolium arvense* **hare's-foot clover** were found by John Edgington flowering in rough ground along an access road to the Tarmac depot, York Way, Camden (Middlesex, vc 21: TQ299840) on 30 September. This is probably the most central location in Greater London, although that title may be vied for by Elinor Wiltshire's record (*Lond. Nat.* **86**: 33–34) from grassland between the Queens Temple and Serpentine bridge, Kensington Gardens (Middlesex, vc 21: TQ269802) in August. Hare's-foot clover was also recorded by the London Wildlife Trust's habitat survey team in amenity grassland north of Colthurst Drive, Enfield (Middlesex, vc 21: TQ346934) on 29 August alongside *Filago vulgaris* **common cudweed** (this determination was tentative) and *Erodium cicutarium* **common storks-bill**.

*Vicia villosa* **fodder vetch** was found by Ian Kitching on 15 May in Mile End Park north of the Green Bridge, Mile End, Tower Hamlets (Middlesex, vc

TQ363825). He also observed plants of the same species in the following places: the west side of Burdett Road near the junction with Mile End Road, Mile End, Tower Hamlets (Middlesex, vc 21: TQ354824) on 26 June; one plant at Horton Park Country Club golf course, West Ewell, Epsom & Ewell (Surrey, vc 17: TQ197636) on 4 August; and the waste area in south-east corner of Morden Cemetery, Lower Morden Lane, Lower Morden, Merton (Surrey, vc 17:TQ235672) on 7 July.

### Fumariaceae

Several plants of *Ceratocapnos claviculata* **climbing corydalis** were found by me in a most unexpected place, Donegal Street, just off the Pentonville Road, Islington (Middlesex, vc 21: TQ310832) on 12 May. These plants most likely came in with recently planted container-grown plants.

The tiny patch of *Fumaria capreolata* ssp. *capreolata* **white ramping-fumitory** that I found in Margery Street, Islington (Middlesex, vc 21: TQ310825) several years ago may finally have been weeded out. I saw one seedling on 10 January, but it was gone by the end of the month.

### Geraniaceae

Aaron Woods recorded *Geranium lucidum* **shining crane's-bill** on 11 March from a verge opposite Finchley Nurseries, Mill Hill (Middlesex, vc 21: TQ236927) and from Eleanor Crescent, Mill Hill (Middlesex, vc 21: TQ236926) on 31 March.

### Iridaceae

The non-native form of the **stinking iris**, *Iris foetidissima* var. *citrina*, is readily distinguishable from our native plant *Iris foetidissima* var. *foetidissima* due to the predominantly pale yellow colour of the flowers; the native plants are mainly pale lilac/lavender blue. Variety *citrina* has recently become very popular in municipal plantings and frequently escapes. I have known it at Camley Street Natural Park, Camden (Middlesex, vc 21: TQ297837) for several years where it cohabits with the native form, although both originated via human activity at that site. Aaron Woods recorded variety *citrina* from a shrubbery, Park Village East, Regent's Park (Middlesex, vc 21: TQ287834) where he has known it since 2002; I would appreciate further records of this plant. *Iris orientalis* **Turkish iris** was found by Ian Kitching on 12 May by the south side of a disused road south of Ridge Road, North Cheam, Sutton (Surrey, vc 17: TQ244659).

### Lamiaceae

*Mentha pulegium* **pennyroyal** appears to be resurgent in recent years, with scattered records from all over the south of the British Isles. Many of these are probably from non-native sources; however, I am unconvinced that all of these plants are readily distinguishable from native occurrences as some observers have suggested. Aaron Woods recorded it from grass alongside the lake near the bandstand, Regent's Park (Middlesex, vc 21: TQ279826) on 18 July. Several other interesting and regionally scarce or rare plants (including *Calluna vulgaris*, *Campanula rotundifolia* and *Rumex pulcher*) have appeared in this most urban of settings; a ready explanation has yet to be found.

Two plants of *Nepeta cataria* **catnip** were observed by Rodney Burton (following direction provided by G. S. Joyce) on 26 August in Lullingstone Park on a mound of earth by the track across the golf course near the descent to Lullingstone Castle (W. Kent, vc 16: TQ52576438). Rodney last saw the *N. cataria* in Lullingstone Park in 1990.

Adam Cheeseman found *Salvia verbenaca* **wild clary** at Bedfont Lakes Country Park LNR (Middlesex, vc 21: TQ080726) on 6 June. Rodney Burton suggested that an unknown person might have introduced this.

### Lauraceae

A young plant, approximately a metre high, of *Laurus nobilis* **laurel** was found by Dave Dawson in Horse Close Wood, Wimbledon (Surrey, vc 17: TQ247728).

### Liliaceae s.l.

*Allium paradoxum* **few-flowered garlic** found by Ian Kitching on 7 April in South Tottenham Community Conservation Gardens, Markfield Recreation Ground, South Tottenham, Haringey (Middlesex, vc 21: TQ343887).

*Leucojum aestivum* **summer snowflake** was recorded by Ian Woodward from Larkswood, Larkswood Road, Waltham Forest (S. Essex, vc 18: TQ383925) on 21 February. Ian did not attempt to distinguish which subspecies the plants were, the native ssp. *aestivum* or the introduced ssp. *pulchellum*; however, they are certainly non-native at Larkswood and were probably planted to 'beautify' the site.

*Ornithogalum nutans* **drooping Star-of-Bethlehem** was found by Ian Kitching on 7 April in a grassy area in the south corner of Tower Hamlets Cemetery Park, Mile End, Tower Hamlets (Middlesex, vc 21: TQ369821).

Two discarded plants of a *Yucca* sp. found by Ian Kitching on 22 April on a spoil heap from Central Nursery, east side of Conduit Lane, Croydon (Surrey, vc 17: TQ344641).

### Malvaceae

A probable first British record for the South African *Anisodontea capensis* was made during the LNHS Botany walk lead by Nick Bertrand on 23 September. A single plant was found growing on wasteland in St Agnes Place, Lambeth (Surrey, vc 17: TQ 314 776). *A. capensis* is a popular horticultural plant that is similar in overall appearance to *Sphaeralcea* from North America. A colleague at the Natural History Museum, Christopher Davis, who is an expert in the family, provided us with the determination.

David Bevan reported that *Lavatera arborea* **tree mallow** has reappeared and is clearly regenerating on the Parkland Walk near Blythewood Road (Middlesex, vc 21: TQ304877), where it has been known since 2004. On 25 April I found a large plant of *Lavatera cretica* **smaller tree-mallow**, alongside several plants of *Reseda alba* **white mignonette**, on a small wasteland site near the River Lea (S. Essex, vc 18: TQ374855). The site has since been engulfed by the 2012 Olympics development.

Whilst cycling along the Regent's Canal near Acton Mews, Hackney (Middlesex, vc 21: TQ334837) on 15 July I noticed an unusual specimen of *Malva*. Although similar to the large quantities of *M. sylvestris* **common mallow** growing nearby, the petals were rather oddly shaped and of a very different colour. The plant also appeared to be sterile. Guessing the plant may be hybrid, I took some material to Christopher Davis who confirmed that it was of hybrid origin and identified it as *Malva* × *decipiens* Chatenier ex Rouy (*sylvestris* × *neglecta*: syn. *M.* × *zoernigii* B. Fleisch.). This is the first known occurrence of *M.* × *decipiens* in the British Isles, although it has been recorded from France, Germany, Austria and the former Czechoslovakia.

### Onagraceae

The genus *Epilobium* is a group of plants which I, like some others, find baffling, not for any good reason. My brain simply shuts down with them! Luckily, we have Geoffrey Kitchener in the region; he has provided several interesting hybrid records, all single plants from Kent. First, *Epilobium* × *vicinum* (*obscurum* × *ciliatum*) from lavender fields near a railway at Otford (W. Kent, vc 16: TQ51582) on 4 June; secondly, *Epilobium* × *floridulum* (*parviflorum* × *ciliatum*) from the same locality, this time on 24 June; then, *Epilobium* × *neogradense* (*montanum* × *lanceolatum*) from Otford Lane, Halstead (W. Kent, vc 16: TQ4861) on 1 July, and finally, *Epilobium* × *interjectum* (*montanum* × *ciliatum*) from Knockholt Road, Halstead (W. Kent, vc 16:TQ4861) on 16 September.

Even more fiendish are the evening primroses. *Oenothera biennis* × *cambrica* was recorded by John Palmer on 18 September from the side of a track by the River Darent near the M25, Dartford (W. Kent, vc 16: TQ5572). This is a group that is usually reported as *O. biennis* in a rather despairing manner. More-detailed recording would be welcomed but I would suggest extreme caution and some background reading before proceeding.

### Orchidaceae

Graham Medcalf asked Rodney Burton to pass on his record of a single plant of *Cephalanthera damasonium* **white helleborine** in a flower bed at Haling Manor Comprehensive School, Croydon (Surrey, vc 17:TQ3163).

George Hounsome reported finding *Epipactis phyllanthes* **green-flowered helleborine** and a couple of plants of *E. helleborine* on 28 July, during a recording meeting at Stocker's Lake at TQ04449348, located right on the Buckinghamshire/Middlesex vice-county boundary. On 9 August George returned to the site and took further detailed GPS readings and concluded the plant and a further six he found were in Middlesex, vc 21; unfortunately, the strimmers had been at work and some stems had been felled. Fred O'Hare found *Epipactis purpurata* **violet helleborine** at High Elms, Bromley. I have been unable to pursue this record further but Rodney Burton informs me the identity was confirmed by David Lang, who recorded *E. purpurata* from Cuckoo Wood, High Elms, Bromley (W. Kent, vc 16:TQ448622 and TQ443626) during the 1950s.

*Listera ovata* **twayblade** was found growing abundantly in a heavily shaded area, on railway land between platforms and a roadbridge at Knockholt Station (W. Kent, vc 16:TQ483629) by Geoffrey Kitchener on 20 May.

Rodney Burton reported to me that a single plant of *Platanthera bifolia* **lesser butterfly-orchid** was found by Dave Johnson west of Highcastle Wood, West Kingsdown (W. Kent, vc 16:TQ558629), roughly where Rodney saw it during the early 1960s.

### Orobanchaceae

*Orobanche hederae* **ivy broomrape** was found by Ian Kitching on 16 June beside a path in the north-west corner of Tower Hamlets Cemetery Park, Mile End, Tower Hamlets (Middlesex, vc 21:TQ367823).

### Phytolaccaceae

One plant with wine-red flowers of *Phytolacca acinosa* **Indian pokeweed** was found by Ian Kitching on 7 July by the entrance to Morden Cemetery beside the bridge over Pyl Brook, Lower Morden, Merton (Surrey, vc 17:TQ235673). The same plant was observed by Ian to be fruiting well on 18 August. Dave Dawson also reported a single specimen of this species from Horse Close Wood, Wimbledon (Surrey, vc 17:TQ247728).

### Poaceae

A single plant of *Anisantha diandra* **great brome** was found by Ian Kitching on 12 April in recently turned soil on the east side of Kimpton Park Way opposite the junction with Wealdstone Road, North Cheam, Sutton (Surrey, vc 17: TQ249657). The same species was also found by Ian on 3 June in gardens by the right bank of the River Wandle, Merton High Street, Collier's Wood, Merton (Surrey, vc 17: TQ266701). *Anisantha madritensis* **compact brome** was found by Ian Kitching on 12 May on Kimpton Road, North Cheam, Sutton (Surrey, vc 17: TQ248658) although he expressed some doubt regarding his determination.

*Briza maxima* **greater quaking-grass** was recorded by John Edgington on 31 July as a casual in the pavement wall of a basement, Myddelton Square, Islington (Middlesex, vc 21: TQ 313.829).

A single plant of a *Bromus* sp., found by the London Wildlife Trust habitat survey team on 10 August at Rectory Farm, The Ridgeway, Enfield (Middlesex, vc 21: TQ3197), was either *B. secalinus* **rye brome** or *B. pseudosecalinus* **Smith's brome**; unfortunately, the voucher was lost and only a photo was available for determination.

*Bromopsis erecta* **upright brome** was found by Ian Kitching on 26 June on the east side of Mile End Park along Grove Road north of Haverford Road, Mile End, Tower Hamlets (Middlesex, vc 21: TQ361830).

*Catapodium rigidum* **fern-grass** was recorded by John Edgington on 7 May in Amwell Street, Islington (Middlesex, vc 21: TQ 312827), an occurrence that was earlier noted by Rodney Burton, in Kent (2000: 85): 'Amwell Street, Islington, many strong plants on pavement, 1990'.

*Ceratochloa carinata* **California brome** was found by Ian Kitching on 6 June on waste ground east of Elmers End Station, Elmers End, Bromley (W. Kent, vc 16: TQ358683). Numerous plants of *Ceratochloa cathartica* **rescue brome** were found in herbaceous borders by Ian Kitching on 12 May in Nelson Gardens, Morden Hall Road, Morden, Merton (Surrey, vc 17: TQ258697). The same species was also found by Ian along the south-east edge of Tower Hamlets Cemetery Park, Mile End, Tower Hamlets (Middlesex, vc 21: TQ371823).

A small colony of *Lagurus ovatus* **hare's-tail** persists on Wilmington Square, Islington (Middlesex, vc 21: TQ311825) despite the best efforts of the street maintenance teams. I spotted it there again on 10 May alongside *Briza maxima* and *Sisymbrium irio*.

One small plant of *Panicum miliaceum* **common millet** was found by Ian Kitching on 27 August in flower beds opposite the junction with Hartfield Road and Sir Cyril Black Way, Wimbledon, Merton (Surrey, vc 17: TQ249703).

Several plants of *Phalaris canariensis* **canary-grass** were found by Ian Kitching on 12 May and 19 August in Morden Cemetery, Lower Morden Lane, Morden, Merton (Surrey, vc 17: TQ235672, TQ229672). A large plant of the same species was also found by Ian on 4 August at Horton Park Country Club golf course car park, West Ewell, Epsom & Ewell (Surrey, vc 17: TQ202632).

The rapidly increasing *Polypogon viridis* **water bent** was found by Ian Kitching on 19 May on the Thames Path, level with the south end of Tunnel Avenue, North Greenwich (W. Kent, vc 16:TQ389792). He also observed plants of the same species in the following places: a car park of County Hall, Milner Road, Richmond upon Thames (Surrey, vc 17: TQ179686) on 29 June; Canadian Avenue car park, Catford, Lewisham (Surrey, vc 17: TQ375735) on the 6 June; Stonecot Nurseries, Stonecot Hill, North Cheam, Sutton (Surrey, vc 17: TQ242663) on the 7 July. David Bevan also reported this species from Coldfall Wood, Haringey (Middlesex, vc 21: TQ276902). Within central London this species is becoming ubiquitous. A single plant of the much rarer and beautiful *Polypogon monspeliensis* **annual beard-grass** was found by the London Wildlife Trust's habitat survey team in Lambeth Palace Gardens, Lambeth (Surrey, vc 17:TQ307793) on the 18 June.

*Setaria viridis* **green bristle-grass** was found by Ian Kitching on 19 August by the entrance to Morden Cemetery beside the bridge over Pyl Brook, Lower Morden, Merton (Surrey, vc 17: TQ235673). *S. viridis* was also found by George Hounsome in the station car park at Hampton Court (Surrey, vc 17: TQ154684).

A large plant of *Sorghum halepense* **Johnson grass** was found by Ian Kitching on 27 August beside a telephone box on the north side of a bus station, Wimbledon, Merton (Surrey, vc 17: TQ250704). The long-known of colony near Lisson Grove on the Regent's Canal towpath (Middlesex, vc 21: TQ270823) shows sign of spreading and I spotted several seedlings in an adjoining street, Cunningham Place (TQ267823). This plant is an invasive weed in warmer parts of the world and is one that I suspect may become too familiar in southern England in the coming decades.

### Polygonaceae

Several plants of *Fagopyrum esculentum* **buckwheat** were found by me on 4 September in Spa Fields, Skinner Street, Islington (Middlesex, vc 21: TQ313824). They probably originated via birdseed.

A small patch of *Persicaria capitata* **pink-headed persicaria** was recorded by me from Frederick Street, Islington (Middlesex, vc 21: TQ307827) on 14 October; as is usual for this plant, it was growing in cracks along the pavement.

### Potamogetonaceae

Most of the pondweeds, with the exception of *Potamogeton pectinatus* **fennel-leaved pondweed**, seem to be in decline in the London area; ironically, as water quality improves, recreation has increased and the destruction of many submerged aquatic plants continues unabated. The known colony of *Potamogeton lucens* **shining pondweed** on the Hertford Union Canal (Middlesex, vc 21: TQ359833) appeared to be thriving when I visited it on 15 July, as were several large patches of *Vallisneria spiralis*. Later that day, I found a tiny patch of *Potamogeton natans* **broad-leaved pondweed** on the River Lea Navigation, Hackney Cut (Middlesex, vc 21: TQ369850). Sadly, the colony is right next to the Olympic Games development site and I doubt whether it will be there come 2012.

### Primulaceae

One small plant of *Glaux maritima* **sea-milkwort** was found by John Edgington on river steps just below the spring high-water level, by the Submariners' Memorial, Victoria Embankment (Middlesex, vc 21: TQ311807) on 6 September.

### Ranunculaceae

*Anemone apennina* **blue anemone** was found by Ian Kitching on 9 April beside a path along the north edge of Tower Hamlets Cemetery Park, Mile End, Tower Hamlets (Middlesex, vc 21: TQ369824). *Anemone blanda* **Balkan anemone** was found by Ian Kitching on 7 April in a grassy area in the south corner of Tower Hamlets Cemetery Park, Mile End, Tower Hamlets (Middlesex, vc 21: TQ369821).

*Ranunculus auricomus* **goldilocks buttercup** was found by Ian Kitching on 9 April beside a path in Tower Hamlets Cemetery Park, Mile End, Tower Hamlets (Middlesex, vc 21: TQ370822). *Ranunculus hederaceus* **ivy-leaved**

**crowfoot** was reported by John Edgington on 14 October from Isabella Plantation and in a stream entering Pen Ponds, Richmond Park (Surrey, vc 17: TQ195723). The former is a well-known site but the Pen Ponds colony is a new site and more extensive. This is pleasing news for a plant that has much declined in the Greater London area in recent decades.

### Rosaceae

*Duchesnea indica* **yellow-flowered strawberry** was spotted by various people and appears to be increasing. Records include: the plant reported by David Bevan at Coldfall Wood (see above); John Edgington, at Sandy Heath, Hampstead Heath (Middlesex, vc 21:TQ263869) on 5 September; Aaron Woods, at Mornington Place, Camden (Middlesex, vc. 21: TQ290832); Ian Woodward, in Ainslie Wood (S. Essex, vc. 18: TQ378921) on 10 June, and a colony found by me in Hanger Hill Wood, Ealing (Middlesex, vc. 21: TQ186820) on 27 September. Another patch was pointed out by Nick Bertrand during the LNHS Botany walk on 23 September, in Pasley Park at the east end of Braganza Street, Lambeth (Surrey, vc 17: TQ319781).

*Sorbus torminalis* **wild service-tree** was recorded by Ian Woodward from Larkswood, Larkswood Road, Waltham Forest (S. Essex, vc 18: TQ383925).

### Rubiaceae

*Cruciata laevipes* **crosswort** was found by Ian Kitching on 19 May in a grassy area between Cantrell Road and the railway arches, Mile End, Tower Hamlets (Middlesex, vc 21: TQ369821).

Occasional plants of *Galium parisiense* **wall bedstraw** were found by the London Wildlife Trust's habitat survey team on moss-carpeted degraded concrete alongside *Onopordum acanthium* **cotton thistle** on 9 August at Holly Hill Farm, Enfield (Middlesex, vc 21: TQ283998).

Several plants of *Sherardia arvensis* **field madder** were reported by the London Wildlife Trust's habitat survey team in a corner of an otherwise 'improved' agricultural grassland at Owls Hall Farm, Crew's Hill, Enfield (Middlesex, vc 21: TL3000) on 3 September.

### Salicaceae

*Populus nigra* ssp. *betulifolia* **black poplar** was found in two sites in Enfield. First, the London Wildlife Trust's habitat survey team found a mature, trimmed tree in the car park of the Robin Hood Pub, Botany Bay (Middlesex, vc 21: TQ296992) in September. Later, I found three trees in mixed coniferous and deciduous plantation woodland, in Trent Country Park, Enfield (Middlesex, vc 21: TQ281961) on 14 October.

### Scrophulariaceae

*Kickxia elatine* **sharp-leaved fluellen** was twice found by the London Wildlife Trust's habitat survey team. First, a single plant at Owls Hall Farm, Crew's Hill, Enfield (Middlesex, vc 21: TL3000) on 4 September, and secondly, another single plant, Park Farm, Enfield (Middlesex, vc 21: TQ292983) on 5 September.

*Paulownia tomentosa* **foxglove tree** seedlings continue to pop up all over central London. It was also found on an LNHS Botany walk at London Zoo, Regent's Park (Middlesex, vc 21: TQ279836) on 6 May, and a further plant was spotted nearby on the Regent's Canal towpath (Middlesex, vc 21: TQ277834) by me on 8 August. David Bevan reported them from a municipal flower bed in High Road, Tottenham, Haringey (Middlesex, vc 21: TQ3390) and I have noted numerous seedlings in the vicinity of my home on Skinner

Street, Islington (Middlesex, vc 21: TQ314824). Doubtless, this is appearing elsewhere and I suspect will become more common over the next few years; will we rue the day we introduced it much as many are beginning to feel about buddleja and *Ailanthus altissima* **tree-of-heaven**?

*Phygelius capensis* **Cape figwort**, or a plant very similar to it (I was on a canal boat at the time), was seen by me on the towpath of the Grand Union Canal in Southall (Middlesex, vc 21: TQ121785) on 21 July. Doubtless, this was a throw-out, but it was thriving and apparently spreading.

*Verbascum bombyciferum* **Broussa mullein** was found by Ian Kitching on 16 June beside a path along the north edge of Tower Hamlets Cemetery Park, Mile End, Tower Hamlets (Middlesex, vc 21: TQ368823).

### Solanaceae

Several large plants of *Datura stramonium* **thorn-apple** were pointed out by Nick Bertrand during an LNHS Botany walk on The Cut, Waterloo (Surrey, vc 17: TQ314799) on 23 September.

*Nicandra physalodes* **apple-of-Peru** was recorded by John Palmer from Bower Road, Hextable (W. Kent, vc 16: TQ5270) on 18 September.

A large patch of *Physalis peruviana* **cape-gooseberry** was pointed out by Nick Bertrand during the LNHS Botany walk on 23 September, growing on wasteland in St Agnes Place, Lambeth (Surrey, vc 17: TQ314776).

Mr R. Groom collected material of *Solanum chenopodioides* **tall nightshade** from Three Quays Walk, near Tower Hill (Middlesex, vc 21: TQ334805) on 18 October. John Edgington noted a single well-grown specimen in waste ground west of the Tower of London on the Thames embankment opposite HMS *Belfast* (Middlesex, vc 21: TQ335805); it is probable that both of these reports are for the same individual or group of plants. *S. chenopodioides* seems to be increasing (although still scarce) alongside the Thames. It has also been spotted recently near the 2012 Olympic Games site on the Lee Navigation, with no detailed location information. Geoffrey Kitchener spotted a flowering plant of *Solanum laciniatum* **kangaroo apple** in Westminster Kingsway College car park, Sidney Street (Middlesex, vc 21: TQ3082). This, he suspected, was derived from material grown in nearby St George's Fields. *Solanum physalifolium* **green nightshade** was found by Ian Kitching on 26 June on Wennington Road, Mile End, Tower Hamlets (Middlesex, vc 21: TQ359832).

## FERNS — arranged alphabetically by genus

John Edgington found *Adiantum capillus-veneris* **maidenhair fern** on 23 October in front of Nutford House, Brown Street, Westminster (Middlesex, vc 21: TQ 275.813).

On 17 April, Howard Matthews found *Asplenium adiantum-nigrum* **black spleenwort** growing with *Phyllitis scolopendrium* **hart's-tongue fern** and occasional *Dryopteris filix-mas* **male fern** on a railway bridge crossing the River Brent and the B455 Ruislip Road East, at the south-east corner of Perivale Park, Greenford, Ealing (Middlesex, vc 21: TQ156823). On the same day he found thirteen plants of *Asplenium ceterach* **rustyback** on the sides of a brick-built tomb, dated 1731, by the east end of Perivale Church, Perivale Lane, Ealing (Middlesex, vc 21: TQ164827), a site known, according to Howard, since 1881. Howard also reported finding, on 21 April '*Asplenium trichomanes* ssp. *quadrivalens* still plentiful with *Phyllitis scolopendrium* . . . on the brick walls of the railway cutting at Three Bridges, Windmill Lane', Ealing (Middlesex, vc 21: TQ151788), a site where it has been known for many years, although *A. ruta-muraria* **wall rue**, previously recorded from there was not observed.

He also noted, on 17 April, *A. trichomanes* ssp. *quadrivalens* **maidenhair spleenwort** with *A. ruta-muraria* in Gunnersbury Park, Hounslow (Middlesex, vc 21: TQ188792) and the latter was also found on a brick wall beside the drive leading from Popes Lane, Hounslow (Middlesex, vc 21: TQ188793). Howard reported that at the British Pteridological Society meeting on 20 October at Hayes Church, Bromley (W. Kent, vc 16: TQ405662), *Asplenium ceterach* and *A. trichomanes* ssp. *quadrivalens* were frequent along the inside of the wall fronting Hayes Street, with *Phyllitis scolopendrium* and very occasional *Dryopteris filix-mas*.

*Azolla filiculoides* **water fern** was reported by Howard Matthews covering a small pool on Stanmore Common, Harrow (Middlesex, vc 21: TQ 1583994085) on 19 June.

Aaron Woods noted a single, small plant of *Cyrtomium falcatum* **holly fern** on 12 April growing on a wall in Taviton Street, Bloomsbury (Middlesex, vc 21: TQ296824). The London Wildlife Trust habitat survey team found another plant on 12 December on a wall in All-Hallows Church Garden, Copperfield Street, Southwark (Surrey, vc 17: TQ318799).

The under-recorded *Dryopteris carthusiana* **narrow buckler-fern** was found by Howard Matthews on 3 September in a belt of secondary woodland on the north side of Rowley Green Common Local Nature Reserve, Barnet (Hertfordshire, vc 20: TQ216962). He reported that several plants were 'uncommonly large, particularly as this is the dryer end of the reserve' and as '*D. dilatata* is frequent in the same area, I checked spores under my microscope; all were fertile', indicating that no hybridity was detected. *Dryopteris* × *deweveri* was found by John Edgington, with its parents *D. carthusiana* and *D. dilatata*, in a mire at Great Halings Wood (Buckinghamshire, vc 24: TQ029895) on 1 December. Howard reported finds from the British Pteridological Society meeting on 20 October: to the east of Keston, a small wood at South Park, Bromley (W. Kent, vc 16: TQ421642) contained *Dryopteris borreri* (syn. *D. affinis* ssp. *borreri*) and two plants of *Dryopteris affinis* (syn. *D. affinis* ssp. *affinis*). *Athyrium filix-femina*, *Polystichum setiferum* and *Phyllitis scolopendrium* were also present. At the same meeting, at Petts Wood, Bromley (W. Kent, vc 16: TQ4468) occasional *Athyrium filix-femina* and *Dryopteris carthusiana*, plus a solitary, large plant of *D. affinis* besides a path (TQ446687) were observed. In Hertfordshire (vc. 20), at Harrocks Wood, Chandlers Cross (TQ068978, TQ069973), on 21 January, Howard Matthews found *Dryopteris borreri* and *D. affinis* (TQ0669597783).

Howard also reported that, at the British Pteridological Society meeting on 20 October a small patch of the alien *Onoclea sensibilis* **sensitive fern** by a stream in Petts Wood, Bromley (W. Kent, vc 16: TQ44906873) were observed, this has apparently been known of for about thirty-five years. Sensitive fern was also found by the London Wildlife Trust's habitat survey team in Milkwood Community Park, Lambeth (Surrey, vc 17: TQ320752) on 12 June.

Howard Matthews refound *Ophioglossum vulgatum* **adder's-tongue fern** at Bentley Priory, Harrow (Middlesex, vc 21: TQ153929) on 18 April, after an absence of several years, on gently sloping acid grassland. This is particularly pleasing for me, as we were unable to find it a few years ago whilst doing survey work for the GLA's habitat survey.

The colony of *Pellaea rotundifolia* in North Row, Mayfair (Middlesex, vc 21: TQ280809) was first seen by John Edgington in 2005. It was feared destroyed at the end of 2006, but he noted that the plant had recovered by October 2007.

Eleven extra individuals of *Polypodium interjectum* **intermediate polypody** were found by Howard Matthews on 27 November growing epiphytically at Scratchwood, Barnet (Middlesex, vc 21: TQ207947) near the A1 road to the south-east of a car park; *P. vulgare*, previously recorded, is also present in the same area. In November, John Edgington re-recorded *P. interjectum* as an epiphyte on fallen willows over the Fleet Brook, draining the Vale of Health Pond, Hampstead Heath (Middlesex, vc 21: TQ267864). He noted that this was first seen in December 2005 as a single plant on one tree; it has now spread to a second tree.

*Polystichum polyblepharum* was found by Fred Rumsey at two sites: Harrington Road, Kensington (Middlesex, vc 21: TQ266788) on 31 January and John Street, Camden (Middlesex, vc 21: TQ307820) on 19 October. *Polystichum setiferum* **soft shield-fern** was found by Ian Kitching on 26 June beside a path in the centre of Tower Hamlets Cemetery Park, Mile End, Tower Hamlets (Middlesex, vc 21: TQ368822). David Bevan also reported this species from Coldfall Wood, Haringey (Middlesex, vc 21: TQ276902). In Hertfordshire (vc. 20), at Furzefield Wood LNR, Hertsmere (TL242021) on 5 February, Howard Matthews found two plants of *Polystichum setiferum* with *Phyllitis scolopendrium* **hart's-tongue fern**. John Dobson found an immature fern, on 17 May, in Church Wood, Trent Country Park, Enfield (Middlesex, vc 21: TQ281961) which he was unable to determine. Rodney Burton identified the plant as *P. setiferum* and commented that he had no recent records from that site.

Probably reflecting the recent lack of frosty winters, *Pteris* species are increasingly to be found. *Pteris cretica* **ribbon fern** was found by John Edgington in Shouldham Street, Westminster (Middlesex, vc 21: TQ274815) on 23 October and, on the same day, he confirmed the continuing existence of the plant previously reported by Nick Bertrand on Lambeth Road (Surrey, vc 17: TQ309791). John also noted *Pteris nipponica* on the Thames Path south of Newcastle Drawdock, Isle of Dogs (Middlesex, vc 21: TQ385784) on 9 September.

# Book review

***Dragonflies and damselflies of Hertfordshire.*** Alan Reynolds, Tom Gladwin and Christine Shepperson. Hertfordshire Natural History Society. 2008. 143 pp. with colour photos, maps and flight charts. £14, paperback. ISBN 978 0 9521685 6 0.

In the last decade a trickle of books on Odonata has become a flood — new identification guides (many superb) as well as new county faunas have been published. There are relatively few species to master in the UK and these books have stimulated much interest by general naturalists into studying and recording these beautiful insects. The Odonata, along with other insect groups, are undergoing dynamic changes in status and distribution, probably correlated with climate change amongst other factors, so it is important that we record these changes.

These changes have been recorded here in this latest atlas to map the distribution in Herts to the north of our area and of course overlapping with our own recording area in the south of that county. The recording period for this atlas covers the period 2000–2005, with nearly 120 people supplying records.

Following the introduction is a fascinating chapter that explores the history of dragonflies in the county. The earliest published records extend back to 1835 and it is interesting to read the status comments of familiar species from over a century ago and compare them with recent times. It has to be remembered that these early pioneers didn't have the obvious advantages of modern optics or excellent field guides, so a few records may have been suspect (is it really that different?) such as some of those for common hawker and golden-ringed dragonflies. More recently we read of the rapid changes through the 1990s and of years featuring unusual migrants such as the darter invasion of 1995. In total thirty species have been recorded in Herts, although only nineteen of these are regular breeders, a relatively small total compared with some more southerly counties.

The reader is then given a summary of the aquatic habitats found in the recording area. The county which lacks any large natural lakes, has had new habitats created from the mid eighteenth century onwards as artificial lakes, and later gravel pits, were constructed. On the debit side many old ponds disappeared as they were built on, filled in or simply succession took over, though in recent years there have been many new garden ponds created, providing habitat for a suite of species.

The river systems are outlined — such as the important Lea and Colne with the underlying geology (mainly clay and chalk) which influences the habitat. The undesirable effects of man such as water abstraction and various pollutants are touched on.

Following an introduction to the survey method using tetrads for mapping we then have the main meat (some thirty-five pages) of the book in the species accounts, which features all nineteen regular breeding species. Each species has at least one photograph dedicated to it (three in the case of blue-tailed damselfly), a tetrad-based distribution map as well as a general account of the species touching on identification, habitat preferences and comments on distribution and changes in status.

It is quite heartening reading the species accounts in finding that most species are at least as common as they were historically and quite a few are new or greatly expanding. The county's scarcest regular breeding species are the enigmatic white-legged damselfly and the hairy dragonfly, the latter having disappeared from the county for some decades before returning again in the south. Among those that have expanded are banded demoiselle, emerald damselfly, red-eyed damselfly and the ruddy darter. Within the last hundred years has been the establishment of the migrant hawker (formerly scarce aeshna) first recorded breeding at Wilstone in 1955 and now widespread and common. Most recently has been the arrival of a species only recorded in the UK for the first time in 1999 — the small red-eyed damselfly at three sites in Essex. It was first recorded in Herts in 2001, and as the authors state, is under-represented on the map as many tetrads had been covered before its rapid spread, but was still recorded in nineteen tetrads.

The criterion for breeding proof is outlined which is followed by records of rare migrants recorded in the county. A chapter on species richness looks at the most widespread as well as most abundant species. Most widespread was blue-tailed damselfly while common blue damselfly was the most abundant. The site with the most species — Amwell with nineteen — is a regular venue for London Natural History Society field trips.

Following this analysis is a very useful chapter featuring the top ten dragonfly sites in Herts with maps, brief habitat description and the main species to be found.

The book is concluded by a glossary of terms and a gazeteer.

In summary, a welcome new atlas on dragonflies that has been beautifully and lovingly put together and my congratulations to the authors. A worthwhile purchase for any student of Odonata in the Herts sector or indeed our own LNHS area. With Odonata showing such rapid changes in distribution in recent years, this provides a robust base line for future surveys that may possibly find further new colonists or expanding populations.

Neil Anderson

# Obituary

Photograph taken 24 June 2000, courtesy of David Bevan.

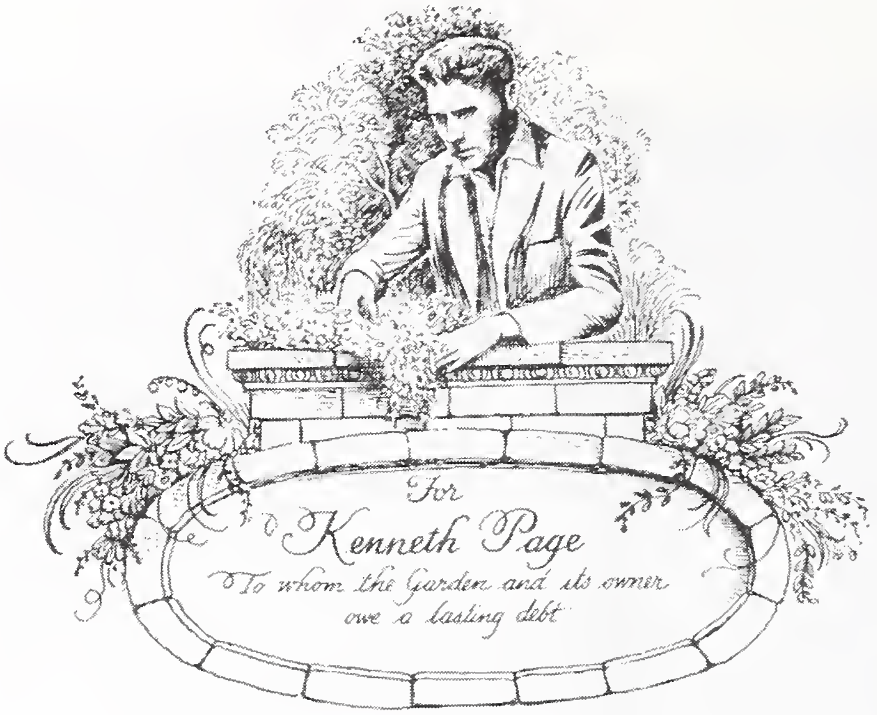
## KEN PAGE, 1922–2007

Anybody who attended a London Natural History Society botany excursion could not have failed to have met and been influenced by Ken Page, and thus saddened by the news of his death after a short illness on 3 February 2007 aged 84.

Ken was born on 7 May 1922. World War II saw him, a mere teenager, in North Africa as a tank gunner with the Eighth Army, and he was later involved in the invasion of Northern Europe. However, this was not a time that he spoke a lot about. After the war Ken took up gardening as a profession and looked after the gardens of several local people, most notably that of the writer Beverley Nichols, who wrote of Ken in his book *Garden Open Today* (1963) 'I am fortunate in having the services of Mr Page. Of all the gardeners I have ever had, he is by far the most knowledgeable, with a scholarly understanding of every form of British plant life and a keen and enquiring mind. He comes on Tuesdays and Wednesdays and also on Saturday mornings, arriving on a motor-bicycle looking rather fierce in a white helmet.'

Ken joined the LNHS in 1979. That keen and enquiring mind certainly helped when, with Bryan Radcliffe and the Bookham Common Survey team, he commenced surveying Bookham Common as a follow-on to an earlier survey conducted twenty-five years previously and published by A.W. Jones in *The London Naturalist* **33** in 1954. They published the results of their survey in *LN* **60** in 1981. They subsequently carried out a further survey and published again in *LN* **82** in 2003. As well as contributing a huge number of general records, Ken showed his considerable expertise in the genus *Rubus*, amassing 199 divisional records of the twenty-nine microspecies he identified on the Common, which formed the basis of his valuable paper, also published in *LN* **82** in 2003.

Ken was a very productive recorder, and with his Surrey Flora Committee hat on, scoured the county looking at sites with what became affectionately



Ken Page

An illustration from *Garden Open Today* by Beverley Nichols.

known as the 'Wednesday Mob', Joyce Smith and Julia Leslie, come rain or shine, to check on old records and discovering new treasures. He also led many meetings, these usually starting late due to being inundated by members with snips of plants to be identified! His encyclopaedic knowledge, which he was always willing to share, usually came up with the answer, but if stumped, would take it home to make sure of the identification and report back at the next meeting.

A lasting memory of him was after the meetings going back to look around his garden; he was always ready to pass on a pot or two of progeny of treasured plants, and give a tour of his conifer collection, all gleaned as seedlings from odd corners of Surrey and each with its own special story. The hospitality would extend to a cup or three of tea and a slab of his sister's home-made cake.

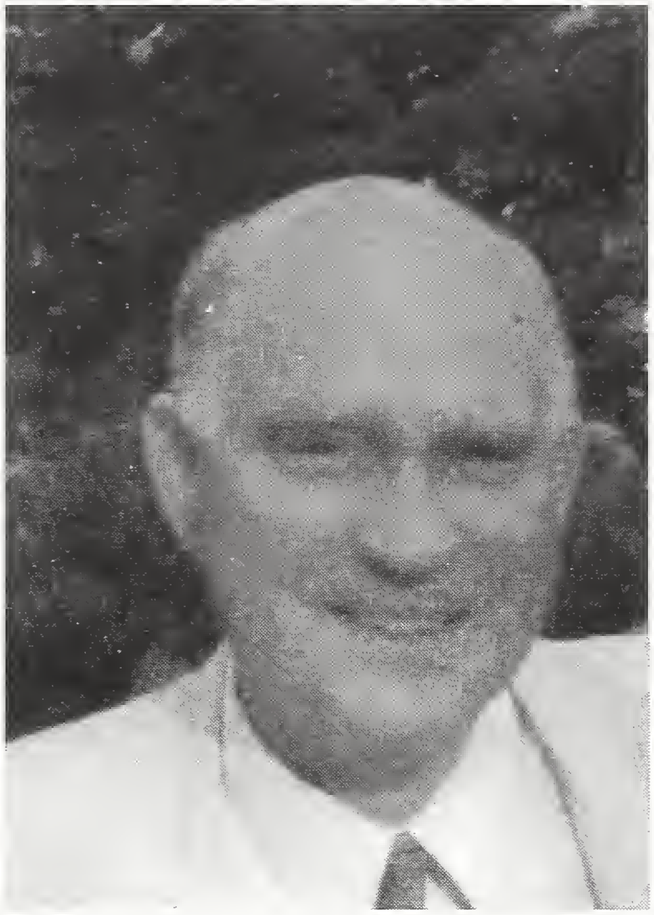
The Surrey Botanical Society database currently holds 21,290 of Ken's records, but as he was very keen on alien plants, and no attempt has been made to enter these yet, the total number of records he contributed will be much higher. Ken also kept an extensive herbarium with around 5,000 specimens, however, many were garden collected.

That was Ken. We, too, were fortunate to have known him and to have benefited from his knowledge. May he continue to inspire us all. Ken is survived by a younger sister Hazel, who continues to live in Fetcham, and to her we offer our condolences.

We would like to thank Ann Sankey, BSBI vc 17 (Surrey) Recorder for contributing to this tribute.

Barry W. Phillips and Bryan R. Radcliffe

# Obituary



## IAN STUART MENZIES MB. B.S., FRC PATH., D. PATH., 1929–2008

With the death of Ian Menzies on 29 January 2008 at the age of seventy-nine, the London Natural History Society has lost a superb field naturalist and a devoted chairman of our Bookham Common Survey team.

Ian Stuart Menzies was born at Blackheath, Kent on 19 January 1929 and spent his early childhood at his parents' home in Warren Road, Cheam, Surrey. It was in his early teens that the family moved to Ferring, Sussex. Soon after the outbreak of World War II his parents sent him to boarding school, Rendcomb College, near Stroud, Gloucestershire. It was whilst there that a natural history interest was first engendered in him by his biology master Dr Ernest Neal (well known for his studies on badgers). Ian's interest remained with him as a hobby for the rest of his life, particularly in entomology.

On leaving college he did his national service with the Royal West Kent Regiment. While stationed near Hastings he would travel on his motorbike back to Ferring whenever leave permitted. He met his future wife Joan in 1950.

When he had completed his army service he began his medical studies at St Bartholomew's Hospital, London, qualifying in 1955. It was in that same year that he and Joan (née Sage) were married. They first lived at Tolworth then bought their first home at Berrylands, both places also in Surrey. Since 1977 they have lived at Surbiton. After qualifying Ian became resident senior registrar for seven years at St Thomas' Hospital, during which time he also became a specialist in chemical pathology.

Ian had been collecting insects since boyhood on holidays from various places but especially from Surrey localities including Ashtead and Bookham Commons. It was on one of his visits to the latter that he met Dr Geoffrey Beven, at that time chairman of the ongoing survey of that Common. Dr Beven encouraged Ian to join the London Natural History Society which he did on 12 October 1989, and almost immediately linked up with that same survey. After the death in 1994 of Brad Ashby (successor to the chair of the survey from Dr Beven) Ian, too, became its chairman.

Ian Menzies demonstrating his bat detector to Eric Groves on Bookham Common.
*Photo: Mick Massie*

Ian's contribution to the Bookham Common Survey, the Society's long-standing flagship survey, was immense. Becoming chairman in 1995 he introduced and subsequently spearheaded the annual entomological Field Studies Days, which have become firm and very popular spring/summer programme fixtures as they give members an excellent opportunity to improve their own specialist knowledge and to contribute at first hand to the ongoing survey work itself. Thankfully for everyone concerned, Ian very rarely missed a Bookham Common event, and always ensured that his annual overviewing survey report for the year published in *The London Naturalist* included a detailed and invariably fascinating account of the findings of each of these study days.

It was also largely due to Ian's tireless negotiating efforts as chairman that the unsuitable and deteriorating survey hut in the grounds of Merritt's Cottage was replaced in 2004 by a much more practical and aesthetically pleasing facility, a fitting memorial to another of the Society's stalwarts, Ruth Day.

The National Trust was waging a losing battle in the 1990s with the scrub on the Common. Subsequently, the NT had access to mechanical clearing for short times each year, and was clearing at times with overenthusiasm, and without consultation. Ian's response was to set up meetings every spring and autumn with the North Downs team of the NT and members of the Bookham Common team. In walking the Common, views were exchanged, and recommendations given. The early, slightly wary, meetings turned, under Ian's guidance, into meetings of old friends and continue as valued consultations. His vision was to have the best SSSI in the country, with the knowledge gained by the LNHS over nearly seventy years, allied to the resources and conservation skills of The National Trust. We have gone a long way to achieving that.

As a naturalist Ian paid enormous attention to detail; as chairman he had a clear view of the broad conservation issues. In these days where conservation is increasingly of greater importance, Ian was an excellent chairman, and achieved much in his years in the post.

An enduring memory of Ian was of his general affable nature and his almost encyclopaedic knowledge of insects which he was willing to impart to all, whatever level of interest they might have. Above all he did so with a never-failing smile.

Ian's charming manner helped achieve his goals, and his determination was intense. ADP remembers one occasion when he felt strongly on a matter, and asked Ian how forcefully he should present it. 'It is important, Alan,' he said, 'and you need to put it as strongly as is needed.'

On Bookham Common, Ian's interest has centred on the coleopterous fauna and as a result he has recently collaborated with Max Barclay and Roger Booth on the production of a *Beetles of Bookham Common,* shortly to be published by the LNHS.

Ian has also collected abroad on several occasions, particularly on the British Entomological and Natural History Society's expedition to Belize in 1998. Whilst in Belize he not only collected beetles but also some fine examples of tropical butterflies and moths.

At the memorial service at Kingston Crematorium on 11 February 2008, Max Barclay spoke from the heart when he paid tribute to Ian's love of natural history, his enthusiasm, his good companionship, and his devotion to his family. Ian has asked for his collection to go to the Natural History Museum where it will rest with the collections of Darwin, Wallace, David Sharp, George Champion and others. It will be cared for as a monument to Ian's commitment to natural history.

To Joan and their three sons we extend our deepest sympathy and we share in their sad loss.

ERIC W. GROVES, GAVIN J. HAWGOOD and ALAN D. PROWSE

# Book review

***Dragonflies.*** Philip S. Corbet and Stephen J. Brooks. New Naturalist No. 106, Collins, London. 2008. 454 pp. Softback, £25, ISBN 978 0 00 715169 1; hardback, £45, ISBN 978 0 00 715168 4.

Like moths, dragonflies now have a second volume devoted to them in the prestigious and collectable New Naturalist series. The original volume from 1960 (by Philip Corbet, Cynthia Longfield and Norman Moore) has long been out of print and commands a considerable sum of money second hand!

Given the incredible surge in interest in Odonata over the last couple of decades it is fitting to have a new volume devoted to them. We are spoiled now with fine identification guides and regional atlases, but here is a book that brings us up to date with the latest knowledge on the natural history of these winged gems. One of the authors of the original *Dragonflies* New Naturalist — the late Philip Corbet, one of the world's most esteemed odonatologists, is co-author of this latest offering along with a former London Natural History Society dragonfly recorder and Odonata specialist at the Natural History Museum, Stephen Brooks.

Following the Introduction we are introduced to the British species, looking initially at distribution, with species grouped as widespread, southern, northern, Continental or oceanic. After a look at habitat types, the accounts of the thirty-nine breeding species plus migrants ensues with some photographs of adults and larvae.

The authors have chosen to try and remove the ambiguity of the word 'dragonfly' which can mean both a member of the order Odonata or more strictly one of the suborder Anisoptera. They have chosen to call anisopterans 'warriorflies' to try and clarify this. I see the logic in this but am not convinced the term will take off — time will tell!

We are then treated to several chapters on life history from habitat selection and oviposition, the egg and the first two larval stadia, the larva's survival below water, and development and emergence.

Amongst the fascinating facts discussed are the importance of polarized ultraviolet light for dragonflies to select suitable aquatic habitats for oviposition (and how they are sometimes tricked into laying on unsuitable surfaces!) to the importance of odonate larvae in aquatic food webs; for instance the invasion of golden-ringed dragonfly larvae into an acidic spring-fed stream resulted in a big reduction of other insect predators, this change apparently induced by climate change.

Climate change reappears in the following chapters. The authors describe the effect of hot, dry summers on the maturation of adults in the Mediterranean region. They speculate that this may occur in Britain in future and suggest that migrant hawker and common darter, whose populations are regularly augmented by migrants from Continental Europe, would be worth monitoring for evidence of this phenomenon.

Other factors explored include topics such as thermoregulation, flight activity, longevity (I often get asked for how long do dragonflies live — so here is the answer!), parasites and predators. The latter include some anecdotes of hornets killing and eating southern hawkers.

Two further chapters explore foraging in flight and one of the most absorbing on reproductive behaviour. The study of the latter was revolutionized with the discovery of sperm displacement where a male can remove sperm from previous matings. Sexual selection is fully investigated.

The bulk of the book is concluded by a chapter on the history of odonatology in Britain from the earliest publications by Ray and Mouffet, through the formation of the British Dragonfly Society in 1983, to conservation with topics such as climate change, effects of land use and how to create a dragonfly pond — something that is incredibly popular with the growing band of wildlife gardeners.

Appendices follow with a checklist of UK species, collecting and photographing dragonflies (the former is controversial these days, but the scientific rationale is justified here), distribution maps and SSSI criteria based on Odonata. A glossary explains technical terms used.

Is the book worth having? A resounding yes — it is a treasure trove of facts about the lives of Odonata and possible avenues for further research. On the whole easy reading, but where more complex ideas are introduced, boxes are provided which explain various concepts. One or two of these, such as Box 5, 'Ultimate factors and proximate cues' in habitat selections, can make for heavy reading.

If you have even the slightest interest in Odonata this will be a welcome addition to your bookshelves and inspire you to understand the behaviour of these insects as you study and admire them in the field.

NEIL ANDERSON

# Obituary

## PAUL ALAN MOXEY, B.SC. HONS., DIP. CONS., FLS, 1938–2007

Paul Moxey died aged sixty-nine on 12 August 2007 after a short illness. His lifelong interest in the natural world developed from a childhood enthusiasm for investigating the tadpoles and other aquatic life forms in a local bomb crater.

He attended the co-educational Harrow Weald Grammar School, and benefited from several inspirational teachers who helped to lay the formal foundations for a career based on sound academic principles. As a sixth former, his enthusiasm for bird watching was fostered by members of the Ruislip Natural History Society and he and his friends were encouraged to visit sites such as Tring Reservoirs. He also participated in an archaeological dig at Bath End Clump, Rickmansworth, which influenced his subsequent fascination with human influences on nature and landscapes.

A long-serving member of the London Natural History Society, which he joined in 1957, Paul helped with the foundation of the London University Natural History Society whilst reading for a degree in geography and economics at University College London. He completed a Postgraduate Diploma in Conservation in 1963.

Paul was able to combine his expertise in fieldwork with the ability to encourage others to work together to promote the cause of conservation long before it became fashionable. In 1963, he became a founding Trustee of the Herts and Middlesex Wildlife Trust. He maintained his commitment to the Trust, serving on its Council and Scientific Committee for many years and being elected vice-president in September 2005.

Employed as a geography teacher with the ILEA with special responsibilities for fieldwork, Paul was able to combine teaching with some ornithological survey work, publishing in 1966 with Stuart Crooks: 'Study of a wintering lapwing population in north west Middlesex' in *The London Bird Report* **30**: 60–79.

He was invited to become assistant editor of *The London Naturalist* in 1966, working alongside the then editor, Ron Payne. The following year he became editor as Ron moved away from London. He relinquished the task of editor in 1971 as a result of the pressure of work commitments.

Paul had moved to Epping Forest in 1970 to become the first Warden and Director of Studies at the Field Studies Council's new day centre, the Epping

Forest Conservation Centre. He was able to support its development from a muddy hole in the ground to a thriving education and research facility providing a base for ecological studies of the Forest and its surrounding area.

He quickly became conversant with the Forest's ecology and in 1978 helped to organize the Epping Forest Centenary Symposium, when papers about the changes in the natural history of the Forest since 1878 were presented and written up in two volumes published by the Essex Field Club. Paul's own contribution was: 'The bird community structure of Epping Forest since 1800', which appeared in *The Wildlife of Epping Forest* published by the Essex Field Club in 1979. This included the results of some detailed survey work which he had carried out in the vicinity of High Beach.

As Warden of the Centre, Paul was ideally placed to encourage research projects and some fascinating results from the detailed analysis of a pollen core from Lodge Road Bog within Epping Forest led to the writing of a joint paper: Baker, Colin, Moxey, Paul and Oxford, Patricia (1978), Woodland continuity and change in Epping Forest. *Field Studies* 4: 645–669. This remains a seminal work on the landscape history of the area.

Soils also featured highly as a research topic and with funding from British Petroleum and the Manpower Services Commission, Paul was able to arrange for the mapping of the soils of the northern part of Epping Forest. This resulted in the publication of a paper written jointly with co-workers, Bharj, Kamal, Hollis, John and Moxey, Paul (1987), Soils and ecology in Epping Forest, *SEESOIL* 4: 24–65.

During his time at the Centre, he was responsible for setting up two important ground-breaking national and international programmes through the RSNC's WATCH scheme to monitor pollution. One enabled children to measure the acidity of rain. In the other, children were encouraged to grow ozone-sensitive tobacco plants thus revealing hotspots of this damaging gas. Both of these pollutants are now higher on the international agenda and are regularly monitored. Ozone now features frequently in summer weather forecasts and its damaging effects are recognized. Twenty years ago, these monitoring studies broke new ground.

For more than twenty years, Paul taught on London University's Certificate in Ecology and Conservation, encouraging planners of north and east London and others to appreciate the interdependence of geology, soils and past land use in shaping current habitats.

Paul's interest in landscape history of the area produced another collaborative paper in 1997: Boreham, S. and Moxey, P. A. (1997), 'A century of vegetation change in Epping Forest determined from pollen analysis of pond sediments' in *The London Naturalist* **76**: 21–35.

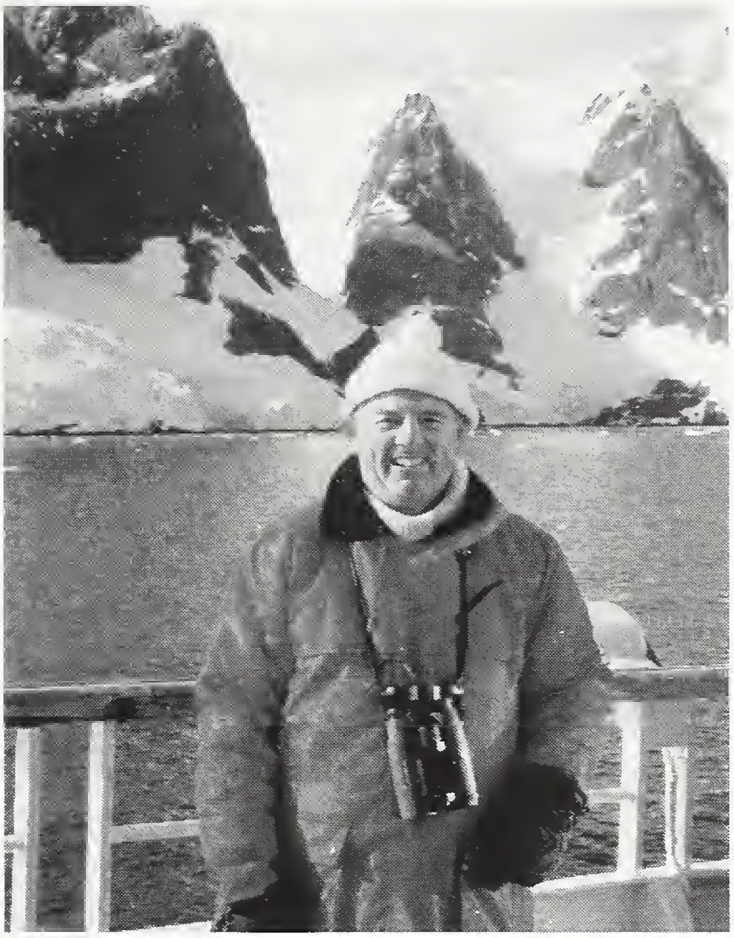
Moving from the Conservation Centre in 1992, Paul became an ecological consultant carrying out surveys and providing considerable management advice to the City of London and others throughout London and Essex. Between 1994 and 1996, he was invited to serve with Dame Jennifer Jenkins as a member of the Royal Parks Review Group and contributed to ecological surveys of Bushy, Richmond and Greenwich Parks as well as the Brompton Cemetery. He also served as a Trustee of Highgate Cemetery.

Paul was especially happy with a pair of binoculars around his neck, wandering around woods and meadows, but sadly his health declined following the diagnosis of diabetes in the late 1990s. However, he was able to enjoy a birdwatching holiday in Cyprus just a few months before his death.

Paul is survived by his wife Patricia, three children and five grandchildren. There are many who owe their increased awareness and appreciation of Epping Forest to his guidance. His special understanding of its ecological complexity will be sorely missed.

PATRICIA MOXEY

# Obituary



## TERENCE ROSS SMEETON, 1942–2007

Terry Smeeton joined the London Natural History Society in 1964. In 1970, after an approach by Dick Homes, he agreed to become assistant secretary of the Ornithology Section, though with a warning that he did not have much spare time in the evenings. He continued in that position until 1974, by which time his family and business commitments had increased. Nevertheless, during that last year he also managed to find time to be the Section's representative on the LNHS Council in the absence of a section secretary between the retirement of Ron Kettle and the appointment of Mrs Lorna Turner to that post.

Terence Ross Smeeton was born in Dulwich in 1942 and educated at Alleyn's School, where, apart from being House Captain and playing First-Eleven cricket, he first acquired his interest in ornithology through field trips to the North Kent marshes arranged by one of the masters. From school he joined the Bank of England in 1960 and spent the whole of his full-time business career there, moving through various departments, including a spell in the Overseas Office, which provided his introduction to Africa with visits to Zambia and Kenya.

He occupied a number of senior positions at the Bank and was particularly involved in the gold reserves and foreign exchange, the latter resulting in evenings spent with him and his wife Linda at their home sometimes being interrupted by phone calls from overseas banking colleagues. Increasing responsibilities at the Bank, not to mention his captaincy of its prestigious cricket team, inevitably reduced his involvement in the LNHS, though, particularly after the family moved to Bessels Green, near Sevenoaks, he became a regular contributor to the *Ornithological Bulletin*, especially of records from his 'local patch' at Chipstead Lake.

During overseas travel for the Bank, which sometimes extended to delivering lectures at international banking conferences, time would be found for a spot of birdwatching if at all possible. He greatly valued these occasions and, following his retirement from the Bank in 1998, similar opportunities arose when, for several years, he worked closely with another ornithological banker, Stephen Rumsey, running an international financial business which required frequent visits to the Far East alongside his continuing commitments as a non-executive director of Standard Bank, which has interests in South Africa.

Unfortunately, hopes for a long and happy retirement with Linda were not to be, as sadly, Linda died in 2001. In her memory, he decided to contribute to a conservation project in Africa where they had spent a number of happy holidays. He selected the Sokoke Forest conservation project, near Malindi in Kenya, the last remnant of the country's once extensive coastal forest.

Apart from his work with the LNHS, Terry was also active in other bird organizations. He was a long-standing member of the British Trust for Ornithology, served on its Council in the 1990s and was for several years up to the time of his death, a director of BTO Services Ltd, the BTO's trading company. His financial support for the Royal Society for the Protection of Birds led to invitations to join parties to see the wader roost at its impressive best at Snettisham and the white-tailed eagles on Mull. A staunch supporter of the journal *British Birds*, he accepted an invitation in 2004 to join the board of directors of BB 2000 Ltd, owners and publishers of 'BB'. Just before his untimely death he had additionally agreed to become one of the Trustees of funds of both the British Ornithologists' Club and the British Ornithologists' Union. Regrettably that did not happen, but there is no doubt that his knowledge and insight into financial matters would have been most valuable.

His sudden death on 12 September 2007 was a great shock to all who knew him. The presence of about 300 people from many walks of life, from international banking to ornithology, at his funeral at his village church at Chevening, attests to the esteem in which he was held. At least he had the pleasure of seeing both his sons, Robert and Jeffery, married within his last two years, one at a convivial occasion in Dublin and the other at a colourful ceremony in India.

Terry was greatly valued as a friend, highly regarded by both present and former colleagues, and a father of whom Robert and Jeffery can justifiably feel very proud.

David Montier

# Book reviews

***Rifle-Green by Nature: a Regency naturalist and his family, William Elford Leach.*** Keith Harrison and Eric Smith. The Ray Society, London. 2008. 621 pp. £32.50, large quarto, hardback. ISBN 978 0 9 03874 35 9.

To quote from the Preface of this volume, 'The opening years of the nineteenth century are one of the most stimulating, productive and dangerous periods in British history . . . . In the midst of this cultural maelstrom a young English naturalist from Plymouth stood poised between the God-given order of the Enlightenment and the coming upheaval of Charles Darwin . . . . William Elford Leach was the first to describe many of the animal species living around the coasts of Britain.'

During The Great Frost of 1814, Leach took up his post as the British Museum's new zoologist under Charles König, Natural History Under Librarian, although, in fact, he would be solely responsible for the zoological collections. Leach was a friend of Lamarck, and of Cuvier, and he taught the man who taught Darwin. He prepared the way to make Britain the birthplace of natural selection, then he sank silently from view, all but forgotten for two centuries.

This volume is an amazing compilation of detailed research covering important episodes in the development of natural history interwoven with momentous events in our social and cultural life. The book has only just been published so I did not want to delay including this brief review as we go to press.

The following two Ray Society volumes have also been published in the past year:

***Index of the books and authors cited in the zoological works of Linnaeus.*** The late Emeritus Professor John L. Heller, edited by Associate Professor John M. Penhallurick. 2007. ix–lxiii, 1–174 pp. £60, A4 hardback. ISBN 0 903874 33 4.

The tenth edition of Linnaeus's *Systema Naturae* is the starting point for the modern, binomial system of animal nomenclature. Consequently, for any taxonomic reappraisal and revision it is essential that it is clear what Linnaeus was referring to. By providing this key to the sources used by Linnaeus, Professor Heller has both clarified problems with *Systema Naturae* and provided taxonomists with an authoritative tool to facilitate their work. In editing this volume, Professor Penhallurick has made available to taxonomists Professor Heller's valuable key to the sources used by Linnaeus.

***De Gallis — On Galls.*** Marcello Malpighi. Facsimile, together with a translation and interpretation of the 1679 edition, by Margaret Redfern, Alexander J. Cameron and Kevin Down. 2008. 110 pp., 14 pages of coloured illustrations. £60. A4 hardback. ISBN 0 903874 41 5.

The importance of *De Gallis* in the history of natural history is indisputable. It is remarkable that in the seventeenth century, Malpighi's understanding of galls and how they developed is close to modern interpretation. The work had not received the recognition it deserves because the Latin text remained inaccessible to most people. This English translation and interpretation of the galls familiar to Malpighi will make *De Gallis* and its meticulous illustrations available to a wide readership, whilst the fourteen pages of recent colour photographs of galls allow direct comparison with Malpighi's original drawings and greatly enhance the value of the work for the modern student.

Ray Society publications are available through booksellers or directly from the Society's agents, Scion Publishing Ltd, Bloxham Mill, Barford Road, Bloxham, OX15 4FF. Tel: 01295 722873, e-mail: simon.watkins@scionpublishing.com

Details of membership may be obtained by writing to The Honorary Secretary, The Ray Society, c/o Natural History Museum, London SW7 5BD.

K. H. Hyatt

# Book review

***The birds of Essex.*** Simon Wood. Christopher Helm, London. 2007. 656 pp., 32 colour plates. Hardback £40.00. ISBN 978 0 7136 6939 8.

This book is a replacement for Simon Cox's, *A new guide to the birds of Essex* published in 1984. Clearly having the first name Simon is the key to becoming an author for the county's avian presence!

The book is a mammoth production with 656 pages and thirty-two colour plates and packed with information to keep any Essex or London birder entertained during the long winter evenings.

The book is well laid out with sections on the county itself, fossil birds, archaeological remains, place names, wetland bird surveys, ornithological highlights, the all important systematic list (the meat of the book in my opinion) and gazetteer.

The information is well presented and the species write-ups are clear, providing good analysis of records including inland sightings, which frequently cover birds seen in the London Natural History Society's area.

Great snippets from the past include the long-staying razorbill on the Lea Valley Reservoirs from 11 November 1934 to 4 May 1935, when it was found dead. It is a shame we do not know which of the fourteen reservoirs it was on; a little more research would have uncovered that the bird was actually present on Walthamstow Reservoirs.

The colour plates cover not just the birds but also habitats; it is however, unfortunate that eight of the plates are crammed onto one page. For me the plate of the Hume's warbler is too small to be of any benefit to the book. I would have preferred two or three plates at a larger size so I could enjoy the quality of these pictures. There are also good illustrations of some species, like the woodpigeons on page 355 or the white stork on page 188. The trouble is, these are few and far between, and many more, in my view, would have added to the attraction of this book.

Graphs and charts are used to display the frequency of some species. These are used exceptionally well showing the peak years and/or months. For example, late April to early May is the peak spring passage for ring ouzel. Great for when you are trying to locate your own birds based on the county's previous records. I used this method to find my own Temminck's stint in Kent.

There are a few errors which any London-based birder would notice. The review of the Wetland Bird Survey reviews the inland sites and splits the Lea Valley into four sections: Walthamstow Reservoirs, King George V Reservoirs, William Girling Reservoirs, and the Lea Valley gravel pits. So far so good, but the analysis of Walthamstow Reservoirs states there are only ten reservoirs and excludes Banbury Reservoir completely. A shame for what can be an important reservoir during the WeBS counts for goosander.

The book will need to stand the test of time and should be as accurate as possible. Like most ornithologists, I wanted to see how accurately my own records had been recorded. All my rare birds were correctly accounted for bar one. The white-headed duck at Walthamstow Reservoirs is listed as being present on two dates in September 1999 and December 1999 but does not show its stay for two months from December 1999 to February 2000.

I happened to stumble on the marsh warbler account and was struck by two glaring errors. Firstly a Barking record has been included which was originally listed in the Essex Bird Report as a probable and not recorded at all in the *London Bird Report*! The sole record for Walthamstow Marshes is listed as a breeding pair in 2001 when there was only a single bird present for two days in 2002!

These two errors were alarming and change the species status in Essex, as out of fifteen records, one should not have been included and another was a migrant, not a breeding pair.

Despite my comments on the book, this is the most up-to-date record of the county's bird life and is a must have for any Essex birdwatcher.

David Darrell-Lambert

# Book review

***Butterflies of India.*** Thomas Gay, Isaac David Kehimkar and Jagdish Chandra Punetha. Oxford University Press. 2008. 71pp, 8 coloured plates. Softback, £3.99, ISBN 978 0 19 568801 6.

*Butterflies of India* is written in English but primarily aimed at the Indian market and in particular to fill a gap as the first non-specialist book on Indian butterflies. It retails at 250 Rupees which at a September 2008 exchange rate was about £3. The book is for people 'who enjoy the beauty of butterflies and want to know more about them'. Approximately a hundred species are described and illustrated, with an emphasis on common species. The photographs, both monochrome and colour, are not at their best on the paper used; while the hand-drawn illustrations tend to be artistic rather than accurate. Illustrations are not to scale though dimensions are given in the text. There is a glossary but no bibliography or references. There are sections devoted to food plants, variations, migration, and conservation.

The diversity of the Indian butterfly fauna, at about 1,500 species, is greater than that of Britain (with about fifty species) though India is a larger country than Britain. The main butterfly groups described in the book are the swallowtails, blues, milkweeds, browns, brush-footed butterflies (the nymphalids), and the skippers. Of the swallowtails, 105 species occur in India out of the worldwide fauna of about 700. Only one species in the book is common with the London fauna; the painted lady *Vanessa cardui*, and which can reach an altitude of 5,000 metres in the Himalayas. As in Britain, habitat loss is the main threat to species. It is noted that trade in butterflies can, if carefully managed, be sustainable and the worldwide annual turnover is estimated at between $US 20–30 million.

The final chapter is devoted to 'butterflying', which includes watching butterflies, gardening to encourage them, rearing caterpillars, and photography.

LESLIE WILLIAMS

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# The London Naturalist

## Instructions to contributors

### Submission of papers

Papers **must be submitted in duplicate** to the editor, Mr K. H. Hyatt at his home address, 1 Tremcelynog, Rhandirmwyn, Llandovery, Carmarthenshire SA20 0NU. Please contact the editor before the end of January if you wish to contribute to the forthcoming issue. However, the editor may be contacted at any time on 01550 760346 to discuss possible contributions, and will be pleased to send a recent offprint to show our style, and as a guide to preparing the manuscript, **which should be followed as closely as possible in regard to layout and typefaces.** Manuscripts **must be double spaced throughout on one side of the paper only** and with wide (3-cm) margins. **Authors must retain a copy.** Papers should include at the beginning an **abstract, summary** or **synopsis. Sheets must be numbered.** Papers are peer-reviewed as appropriate. After acceptance, the editor would be pleased to receive contributions as Microsoft Word-compatible files **together with two matching hard copies of the final text.** Papers should be relevant to the natural history and archaeology of the London Area. This includes comparisons between London and its surrounding countryside with other localities, as well as work relating to or comparing species or habitats which occur in the London Area. Contributions of relevance nationally will also be considered.

### Text

Locality spellings should follow the latest editions of maps published by the Ordnance Survey. Capitalization should be kept to a minimum. Common names of animals and plants must begin with lower-case initials (except for proper nouns), and **only** Latin names of genera and species must be underlined unless typed in italic. When both common and Latin names are given there should be no brackets or commas separating them. **Genus names should appear in full where first used within each paragraph.** When scientific names are taken from a standard work, which must be cited, authorities should be omitted. In descriptive matter numbers up to a hundred should be in words, except in a strictly numerical context. Dates should follow the logical sequence of day, month, year, i.e., 25 December 1971, but in lists may be as 25.xii.1971. Measurements should be in metric and follow the SI system (Système International d'Unités), with imperial equivalents in parentheses where appropriate. There should be no full point following Dr, Mr, Mrs, or St. Lists should be in systematic, alphabetic or numerical order. **Hyphens should not appear at the ends of lines** as the right-hand margins of manuscripts do not need to be justified: **turn off the hyphenation option. Tables and figure legends should be typed on separate sheets at the end of the text. Word-processed text should not use italic, bold or compressed typeface. Paragraphs should be indented. Sentences must not begin with numerals.**

### References

Reference citation should follow the examples given below. Capitalization in titles of books and papers in journals should be kept to a minimum. Journal titles should be in full, or follow the abbreviations in the *World list of scientific periodicals,* and be underlined or in italics. Book titles should also be underlined or in italics.

Examples are as follows:

In text:

Meadows (1970: 80) or (Meadows 1970).

In references:

MEADOWS, B. S. 1970. Observations on the return of fishes to a polluted tributary of the River Thames 1964–9. *Lond. Nat.* **49:** 76–81.

MELLANBY, K. 1970. *Pesticides and pollution.* Ed.2. Collins, London.

WHITE, K. G. 1959. Dimsdale Hall moat, part II. *Trans. a. Rep. N. Staffs. Fld Club* **92:** 39–45.

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# The London Naturalist

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